INDUSTRIAL-ARTS MAGAZINE

Vol. II OCTOBER, 1914 No. 4

"NEXT"

William Hawley Smith

IN his essay on Napoleon, Emerson says: "Here was a man who always knew what to do next. *Few men have any next.* They live from hand to mouth, and are ever at the end of their line; and after each action they wait for an impulse from abroad."

The italics in the above quotation are mine; but the sentence states so widely extended a condition in humanity that the words really ought to be in capitals to do the subject justice.

As one looks about in this world of incompleteness, there is not one shortage in the human family that strikes him quite as forcibly as this lack of nextness (if I may use that word) in the thoughts, words and deeds of men and women as they go. The range of this weakness, or inability, runs all the way from Adam and Eve's apple-eating to the latest report of "didn't know it was loaded," or the man with a new automobile who turned a corner at a speed of fifty miles an hour, or tried to make a grade crossing in front of "The Flyer," and killed his engine in the center of the track!

All of these people, and millions like them between our first parents and the latest victim, suffer, bleed and die, because they "have no next" in their unfortunate doings.

The pity of it all!

And so it seems to me that one of the chief needs of mankind, especially for the young and rising generation (you can't do much for the old ones, for their ways are "set." They are "joined to their idols" and few of them can ever be budged therefrom), is to be specially instructed and disciplined in the theory and art of *what to do next.*

It is because these things are so that it is of the greatest importance that this feature of the purpose of education be taken into account in any and all courses of study, and systems of instruction, that young people are subjected to.

As a matter of fact, this factor has been considered, to a degree, by those who have had the making of the courses of study and the determining of the systems of instruction that our children have had to undertake, since the days when the idea of educating "all the children of all the people" came into vogue.

To this end, not a few educators have held that the pursuit of some one study would bring about such a result; others of the same profession have counted some other study as par excellence in this regard; and each was doubtless right from his own viewpoint.

When I was a boy (now a good deal more than half a century ago), it was counted that Mental Arithmetic was the *sine qua non* for teaching nextness, or what to do next. And as that study was then taught, in the times when "Colburn's Mental Arithmetic" was the infallible book of inspiration and revelation in that branch of learning, the claim made for its efficiency in this regard was not ill founded for such pupils as were mathematically "long" enough to profit by the discipline this study afforded. There was sound logic at its base, and its conclusions were always invincible. There was always an *"If"* to start on, and a *"Therefore"* to fetch up with; and between these two the screw and lever of irresistible syllogism got in their work unerringly. The plan and execution of such exercise was on the straight line of teaching "what to do next."

I shall never forget my surprise when I came to study "Logic" with a big L, at finding that it was nothing but another (and sometimes not so clear) way of doing what I well learned to do in old Colburn's Mental.

The drill in real logic which the study of this book afforded, began with the simplest work. Thus: "If John has two apples, and James gives him two more, how many apples has John?"

And we used to have to stand on our feet and say: "IF John has two apples and James gives him two more, John would then have as many apples as is the sum of two apples and two apples. Two apples and two apples are four apples. *Therefore,* under the terms of the proposition, John would have four apples."

That was "good stuff" for me, and for some of the others who were my boyhood classmates. The logical and "next" ways that I was drilled in then, have stayed with me till this "present now" and will stay with me to the end of the chapter.

To be sure, these things which were of such value to me were of little account to Lucy Trow and Eliza Winslow, to whom the "process" was as sounding brass and tinkling symbal. However, both of these girls, as they grew up, got the same sort of training out of making adjectives agree with the nouns they modified, in the study of Latin, for they vibrated in that plane. But that is another story, as Kipling used to say.

What I want to get at in this article is, that I am strong in the faith that *Manual Training affords an opportunity for teaching the greatest number of pupils the*

value of knowing what to do next, and of training them in that art in a way that will be of the utmost advantage to them all their lives long, that surpasses many other educational means for producing such result.

My reason for thinking thus is that this manual training work furnishes a medium of accomplishing this greatly-to-be-desired attainment because its concreteness appeals to multitudes of pupils whose training in "what to do next" can be secured in no other way.

The abstractions of mathematics and the subtle relations which the agreements of word-forms present fail to make definite impressions on a large percentage of pupils, take them as they go; but few are they who cannot respond to constructive exercises done in wood, brass, flour, calico, or a hundred-and-one other *material things.*

It is the putting together and *arranging in order* of all these *things,* and of what can be made out of them, which can be made the *means* of teaching the great mass of our school children the value of what to do next, and of *getting them into the habit of nextness* in all their ways of life.

BUT:—IF Manual Training does this—if it establishes pupils in such manner of life and way of living that they will "always know what to do next," it must be TAUGHT RIGHT.

And I am forced to admit that this point, just made, needs *emphasizing, tremendously,* in many schools where Manual Training is now in vogue. I do not say this complainingly, or howlingly, or kickingly; but I do state it as an undeniable fact which is very patent to all who know what Manual Training is really for—what its mission as an educational factor really is, and who are familiar with things as they are in many of our schools at this writing.

These conditions are not happy, and they ought to be remedied. This goes without saying and yet it must be said. They hurt the cause they are supposed to help and in many cases they result in giving it a backset which it will take a long time for it to rally from.

A little while ago I was in a school where the boys and girls in a woodworking class were going to make something for Christmas, each after his or her own heart's desire. The idea was a good one—one of the best in the world. But let me tell you what I saw by way of its execution:

A girl of about sixteen years of age had a mind to make a small wooden box for her sister. She was to make it out of 3/16-inch poplar lumber, and it was to be 6 inches long, 3 inches wide and 2 inches deep, *outside measure.* So much, so good.

And here is how she got drill in what to do next, in the making of that box:

She took a 3/16-inch poplar board a foot wide, and about 12 feet long, out of which she was to get her material. It was clear lumber, dressed on both sides and the finest of its kind. And it was of a kind that costs money—good money!

To this board came this girl with a *rip-saw,* and started in to cut off a piece of it something more than a *foot long,* sawing *across the grain!* With the very first stroke she made with the saw she split the board, almost in the center, for nearly two feet of its length; and all of her work from that point on was of a similar sort.

I found by asking her that she didn't know the difference between a cross-cut saw and a rip-saw. Fact!

Of course this case is a very crude one, and I hope its like is both rare and exceptional; and yet it happened in a city that boasts of more than 500,000 inhabitants, and the girl's teacher is a graduate of a celebrated Manual Training Normal School.

Too bad, isn't it?

Now I don't say that it is always this way; but I do say that things similar to this, of the same objectionable trend, are much more frequent than they ought to be in our manual training work, take it up one road and down another; and I am sure that many of our best manual training teachers who are observant, and who know the situation, will sorrowfully agree that what I have said is true. And yet there is doubtless a reason for it. There always is a reason, if we can really get at it.

And I grant, right here, that it is hard work for any teacher of this educational ways and means to rectify this unfortunate condition. Yet this must be done if this form of teaching the young is here to stay, and if it becomes efficient as a means of training our children and of helping them to know what to do next, and to practice nextness in all that they do.

In practical schoolroom work the hardest thing to be accomplished on this account, is to keep the members of a class working in such a way that they can *all* get the benefit of the instruction that the teacher gives, or ought to give, and of the discipline that should follow the same.

I saw a class in sewing a few days ago where this is what took place:

The pupils were all working on the same kind of garment, which was just as it should be. Before they began their work, the teacher stood before the class and told them just what to do *for that day.* This was good too. *But,* when the class went to work, hardly any two of them had arrived at the same point in the making of the garment they had in hand, and only a small portion of the class *did any work at all on the part whose making they had had special instruction on for that day!*

To be sure, the teacher "went about doing good" among the pupils as best she could, during the hour that followed her instruction to the class as a whole; but there was little in it that was of *educational value,* and almost none at all in the art of knowing what to do next and of doing just that.

And the worst thing about all this and its likes, is the fact that so many teachers fail to see the wickedness of it. So many of them seem to feel that if they succeed in getting pupils to "make things"—to make *something*—they are teaching Manual Training.

But they are not!

The fact is, there is little or no training at all in what they are doing, when done in this way, merely. There is in it all scarcely a trace of effective drill and discipline in the art of what to do next, which, as I have

said, is the chief need of the children, and so should be the leading aim and purpose of all their educational work.

Of course, the chief reason why this particular failure in exploiting manual training at its possible best is so common and so bad, is that all work along these lines is so *new*, and that *so few know just what to do about it when it comes to detail.* That is why it is well to have institutes and teachers' meetings and associations, where teachers can get together and confer on these "issues of life" for the cause they represent. It is also the chief reason for the existence of Manual Training Magazines and other literature, in which these matters are discussed and the best things to do about them are pointed out and considered.

And the live teachers, the ones who are worth while, who earn their money and lead pedagogical lives that are worth living, are the ones who make it the aim and purpose of all their work to teach their pupils what to do next, and who avail themselves of the every means that will enable them to do this in the best possible way; for by such means only can they give to their pupils a better chance for a heaven hereafter, because of the help this work will be to them in making something nearer heaven while they linger on this mundane sphere! Teachers who work by this rule may be able to even read this article without getting mad about it! Indeed, if they do get mad about it, they need to be anxious about the quality of work they are doing, especially as it pertains to teaching their pupils what to do next.

(An old Scotchman once said to me: "Weelum, if a mon says aught agen ye, and ye ken it's a lie; gie that na thought. But if a mon says some'at agen ye, *an' it stops wi' ye; that's some'at to think about!*")

If what I have written so far "stops wi' ye," dear reader, think about it.

"Yes," says the dear reader, "but tell us how to do what you say should be done."

How I wish I could tell how to do what should be done in such a way that every teacher who "reads the directions" could and would do it! But I can't. No one can.

In so complicated a condition, where all the factors in the problem are so varied and unstable, no one can dictate detailed and concrete directions, which, being followed, will produce the same results every time. Human nature cannot be dealt with in that way, tho not a few there be who seem to think that it can be. More's the pity!

But here is what can be done: Certain fundamental principles can be laid down, which, being followed, will put both the theory and the art of manual training at work on righteous lines. Of such, by far the most important and basic one is that which I have noted, namely:

Every manual training teacher should constantly keep in mind the fact that the chief value of this means of educational growth and development lies in its possibilities of establishing in the pupil habits of nextness —of training boys and girls so that, as men and women, they will "have nexts" and act accordingly. If teachers will do their teaching by that rule they will never go far astray.

WILLIAM HAWLEY SMITH
Peoria, Ill.

For example: Take the case cited of the girl who was making a box for a Christmas present. It is a very simple case but it will serve well as an illustration of the point I am making.

So far as educational essentials for this girl are concerned, neither the box nor its making had anything whatever to do with the case. Doing the work as I saw her doing it did far more harm than good. As a matter of fact, it was an exercise in thoughtlessness, carelessness, wastefulness and extravagance! There was not a single well-grounded "next" principle or performance in all that she did. Her thoughts and deeds were all chaotic.

Need I point out how all this could have been different and how the making of that box could have resulted in the very best of discipline in what to do next?

In the first place, the girl should have been led to have a clear and definite *idea of just what she wanted to make.* As The Book says: "To begin with, there was the idea." (It isn't translated just that way in our Bibles, but that is what the words really mean. If you care to know where and how, read the first six words in the Gospel according to John and you'll see. That is, I hope you will see.)

So, to "begin with" this girl should have had an *"idea"* of her box.

Which means that, in the work of training any child to "have a next," the first thing to establish in that child's mind is a mental picture from which all action should set out.

So this girl should have been led to have a clear conception of what sort of box she was going to make—its length, breadth and depth, *to begin with,* and before she made a stroke by way of execution.

Next, she should have determined what she was to make a box out of, how many pieces it would take, and the dimensions of each piece—all this, to the utmost of exact detail. Let me take time to say that she should know that she had to have four pieces of material 6″ long, two of them 3″ wide, and two of them 1⅝″ wide. These four pieces would make the four sides of the box, and for the ends she would have to have two pieces each 2⅝″x1⅝″.

With this picture clearly in mind she should next see that from 6″ of board, sawed off the end of 12″x 3/16″ poplar board which was 12-ft. long, she could get the six pieces she needed for making the box; that is, two pieces, 6″x3″; two pieces 6″x1⅝″ and two pieces 2⅝″x1⅝″. *This* she should have thoroly worked out and had in mind before she made a single stroke in the work of making.

Oh, I know this is simple and prosy direction; but let's go a little further with it: *Next,* she should have marked off, with a square, 6″ on the end of the board.

Next, she should have taken a "fine" cross-cut saw and cut off the 6″ she needed for her work—no more, no less; *and she should have done just this the first time trying.*

But I need not follow the detail further. I have given enough to illustrate clearly what I mean.

Now won't you, dear reader, take time to "think over in your mind," the two ways of making a Christmas box that I have here told about, and of the difference in the educational value of the two processes? And then, won't you "think over in your mind" your own ways of working, and see how nearly they tally with "the only way" that really counts? If you will do this, my notion is that it will be worth while.

If you are a good teacher of manual training, if your work results in enabling your pupils to know "what to do next," and to do each next thing right—if this is the way these things are in your case, your reflections from thinking them over in your mind will make you happy.

But if your work is of the sort that results in your pupils doing things in any old way so long as they are done; if they make Christmas boxes for the boxes' own sake, and just for the sake of making them; if they spoil and waste several times as much material as they use; if they use wrong tools in the place of right ones, having never been taught the difference between the two; if their work is chaotic instead of "everything in order;" if they do not get the best of drill in nextness out of their work with you—well, if this is the way things look to you as you "think them over in your mind" —if the thing "stops wi' ye"—don't you think that something ought to be done about it? If so, I wonder what? You tell! Next!

Designed and Executed by Students of the School of Fine and Applied Arts, Milwaukee State Normal School.
Mr. Alexander Mueller, Director.

School Lunches in the Rollo, Ill., Consolidated School

Gertrude Ohlmacher

THAT the serving of school lunches has a place in every rural school will not be denied by any who have given the subject of the proper feeding of children thoughtful study. The food of the average country child lacks in quality, never in quantity. He is underfed, oftimes, not because of lack of food, but because no consideration has been given to the study of food values by his overworked mother, and often excellent food has been spoiled in its preparation. Then, too, the school lunch is eaten cold, and even if of good and sufficient food is eaten at no set time and place. Cleanliness, pleasant surroundings and a certain amount of ceremony seem to be necessary to an appetite. This fact was brought forcibly to us at the beginning of our experiment in serving warm lunches at the Rollo Consolidated School. At first the children were served at their desks in the schoolrooms. The lunches were not well patronized until the method of serving was changed, and tables attractively arranged were set in the Domestic Science kitchen. Not until then did the girls of the High School become constant and appreciative patrons. Several of these girls confessed that the lunch baskets containing cold lunches were taken home with the food uneaten, and some of them were in the habit of bringing no lunches. When we consider that many of the children of a consolidated school leave home shortly after seven o'clock on winter mornings and do not return until after five o'clock in the evening, we have some idea how much to be commended is a system which gives to the growing child a wholesome, appetizing lunch at the noon hour. There is much also to be said of the social value of the school lunch and its place in the training for good habits and the acquiring of refined tastes; but our object in this paper is not to advocate the system of serving lunches so much as to tell how it may be done.

A year ago, when the new school building was erected, a wise board of directors provided for the equipment of a Domestic Science kitchen. This kitchen is fully equipped to accommodate twelve pupils working at the same time. The course in cooking was given this year to the girls of the Freshman class—only six in number. The time allotted to the work was two eighty-minute periods in the kitchen and one forty-minute period for recitation. The class was composed of girls who had had four months in practice of cooking during the previous year. When work began in September, the plan of serving warm lunches to the school children during the months of January and February was determined upon. The class was started with the study of dietetics, together with much practical work in cooking. The September work included the canning of fruits and vegetables and the making of jellies. This material was used later in the school lunches. The second month was given to the study of breadmaking. Much practical work was done, and the product from the bakings was sold at the Teachers' Home. The money thus obtained was put aside to be used later in getting additional equipment for the kitchen. In November, the class was busy with the making of pastries which were sold to the school children. In December, much time was given to the study of the cost of food and the planning of dietaries. This work was interrupted during the week of the Farmers' Short Course when the girls served warm lunches to the farmers and their wives. With the little fund thus obtained, utensils and materials for starting the school lunches were bought. When once started, they became self-supporting. Prices were figured closely with the intention of making the system pay for itself; but without figuring on profit. All the material was bought from the one little store in the village and as we could not buy in very large quantities, no reduction from retail prices was given. Skim milk was bought at eight cents per gallon, whole milk, butter and eggs were bought at market prices from farmers. By figuring closely and eliminating unnecessary waste, all materials were paid for with the money from the sale of lunches. The school furnished the fuel—gasoline gas—for the cooking. After a few weeks of serving lunches, the class bought a bread-mixer which aided them in their work. A few dollars which still remain will be spent for a fireless cooker. The lunches were well cooked and wholesome, and cost each child four cents a meal. The lunches usually consisted of a cup of hot cocoa or a cream soup with crackers, some dish such as mashed potatoes, rice, macaroni, beans, salmon and other escalloped dishes. Warm breads were often served as corn bread, muffins, rolls and occasionally yeast breads as whole wheat, nut and raisen bread, graham bread and German coffee cake. Puddings were usually served for dessert, varied with plain cakes, gelatin and jam or jelly tarts. At first only two warm dishes were served at a luncheon, and the children supplemented these by bringing additional lunch from home; but as the possibilities of the plan unfolded, more was added and the children ceased to bring lunch from home except an orange or an apple. We also learned the individual tastes of our patrons and a choice of dishes was often allowed.

The work of planning and serving lunches meant much work. The class of six was divided into two divisions. Each appointed a chief cook whose duties were the purchase of supplies, the apportioning of the work among her assistants, and the planning with their help of the lunches. She was also responsible for the tidiness of the kitchen. One girl was appointed to keep accounts and to handle the money. Care was taken to see that each girl had an opportunity to assume different duties, so she could become familiar with all. Children from the grades helped to serve and to wash dishes. These children were given lunches to pay for their service. To do away with much of the dreaded task of dish washing, paper plates placed upon paper napkins and covered with squares of paraffine paper were used in place of china. These were destroyed when soiled. Besides

COOKING ROOM AND DOMESTIC SCIENCE CLASS IN THE ROLLO CONSOLIDATED SCHOOL.

these each child furnished a cup and spoon and washed and put them away himself. The tables were neatly set and the children were seated and served in turn. Good spirits prevailed during the lunch hour and very little rudeness was ever shown. Sometimes one of the teachers lunched with the children and the domestic science teacher was always present, except when occupied by other duties. Twice during the week she was busy with sewing classes in another part of the building. At these times the girls assumed full responsibility in the kitchen. Only such dishes were then cooked as they were perfectly familiar with or those governed by the same principles of cooking, tho differing in product. Each girl who helped in the cooking of the lunches carried besides her domestic science work, four full courses in the high school.

Altho none of the patrons of the school had felt the need of serving warm lunches at the school previous to our experiment, when their value began to be understood it began to be difficult to provide for the pupils wishing to patronize the lunches with the equipment at hand. When the lunches were discontinued at the beginning of March, there were many requests to have them continued; but it seemed unwise to do so, as other work had been planned for the class in cooking. Had the girls of the class the privilege of deciding the matter, they would have voted for the continuance of the lunches; for tho the work was hard, they had been keenly interested in it.

Our experiment teaches that the serving of lunches to the pupils has a place in the consolidated school, not only from the standpoint of the pupil who patronizes it, but from the standpoint of modern education—the training for service. For, thru the serving of lunches the pupil acquires habits of neatness, punctuality, ability to assume responsibility, and it gives to the country girl a chance to work out in practice her study of food values and the cost of foods. It cannot be substituted for a course in Home Economics, but it has its place in such a course.

OUR lives are enriched, not by having a wealth of bric-a-brac about us, but rather by the possession of a few really beautiful objects which we have the open eye to see and appropriate.

C. Hanford Henderson.

Organization of Teaching Material---Examples for the Teacher of Manual and Industrial Arts

Prof. F. D. Crawshaw, University of Wisconsin, Madison, Wis.

(Second Article)

THE point of view with reference to organization in Manual and Industrial Arts teaching was given in the first article in this series. The reader who will be interested enough to follow up the series should know the writer's plan for this and succeeding articles.

It is proposed that in this and the next article, problems with which the teacher, as distinct from those with which the supervisor should be particularly concerned, be dealt with. Herein the material considered will be that which has to do with the particular process of imparting information during the class period—teaching material such as courses of study, daily plans, etc. In the next number in the series, material of an administrative character will be handled—devices to aid in the operation of class machinery.

In the third and fourth articles, the sequence of the first and second will be followed but the supervisor rather than the teacher will be the one to whom the discussion will be directed, and for whose particular benefit the illustrations will be given.

Position of the Special Teacher in the School System.

Before we discuss the problem of organization of teaching material for the teacher of the Manual and Industrial Arts it will be well for us to determine what his position is in the school system, and what relation he has to the other individuals who are responsible with him for the progress of pupils in the school.

We must, first of all, regard the teacher of Manual and Industrial Arts as a "special" teacher. He is a teacher of one subject. Notwithstanding this fact his work should be an integral part of all that is done in the school. He should, therefore, seek sanely to correlate it with other "subjects" taught. If he does this he will regard his work not so much as that which may be classed under the word "subject" as he will that which may be included under "manipulation and construction" —*a fundamental activity.*

Having this view he will organize his material so that the *pupil* rather than the *subject* will be of primary consideration. Hence he may very legitimately teach, thru this manipulation and construction, the subjects of arithmetic, geography, language, etc., indirectly if not directly, quite as much as some branch of shopwork or drawing. Furthermore, this conception of the teaching of manual arts will make it necessary for him to organize his teaching material with respect to the "fundamental activity" possibilities of youth. He will study carefully the natural play instincts of children—what games they, of their own volition, play at certain periods; the average physical and mental reactions to certain types of work and to particular constructive problems; the nervous effect of certain work, etc., etc., before detailing his course of study; in fact before he frames it in the rough. Manual and industrial arts teachers are more inclined to think of the technical and mechanical elements in their work than they are of the psychological elements.

It should not be forgotten, however, that without a careful consideration of the physical, nervous and mental temperaments of the child, we cannot expect from him his best in any work which functions in motor expression. The study of the "fundamental activities" must be regarded as a serious business by the teacher of handwork.

This point will be of value not only in his organization of teaching material, but it will help to give him a relationship with his colleagues which will make him an integral part of the school rather than a specialist, only, in one department. It is true that superintendents of schools are looking for specialists in manual and industrial arts when they employ teachers for this work, but they are interested also when securing teachers to get those who will see beyond and outside of their specialty. They want teachers who will have the general welfare of pupils at heart—teachers who will regard the school, quite as much as a department, as a field for work.

In the National Education Association Report for 1913 (pp. 297-307), some of the prominent superintendents of public schools in the United States discuss the general problem of the place and the efficiency of the supervisor and special teacher. It is evident from the discussion that these men want subject specialists in these positions. They want quite as much, however, men who see the large problems in education and who will lend their support to the accepted school policy adopted in solving them.

To illustrate more clearly what the relationship between the special teacher and other officials in a school system should be, the diagram in Fig. 2 is presented.

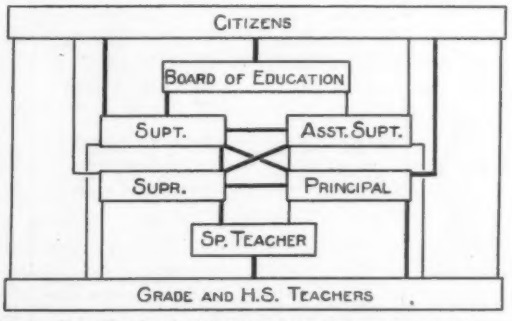


Fig. 2. Chart Showing the Relation Existing Between Officials, Teachers and Citizens in a Public School System.

In this diagram the place of the teacher of manual and industrial arts is given by the rectangle marked "Sp. Teacher."

This rectangle is connected with others, each of which is marked to represent particular officers or groups of people. Altogether these officers make up the

elements in a community having supervision of the schools.

Co-operation.

In this discussion we are interested only in the special teacher rectangle connections and the kind of lines making the connections. There are two kinds of lines: narrow and wide. The width of line and its length express the importance of the connection. Note that the relation which the special teacher (in this case, the teacher of the manual and industrial arts) has with the superintendent and the assistant superintendent, is of less importance, officially of course, than that which he has with his supervisor, the principal of the school in which he works, or with the regular teacher. These last named individuals are his direct associates in the work he is doing, and with them he must co-operate to secure the best possible results. If he has relations with the superintendent or assistant superintendent, they should be those made thru the supervisor if there is one; otherwise, those made thru the principal.

Correlation.

Co-operation carries with it a correlation of subject matter. From the supervisor the teacher will get general outlines, plans and policies. (These will be presented in a future article in this series.) He should get from him also the best teaching assistance, for the supervisor should be a master teacher.

From the principal and teacher he will get his means of applying the general aids of the supervisor to specific problems. In other words, it is from these two last named individuals that he will get his *focus points* in teaching, viz: information regarding the pupils and the kind of projects upon which they can most effectively work.

IMPORTANT EVENTS TABLE.

Months	Birthdays	Holidays	Season Elements	Community Work
Sept.	Taft	Labor Day	Harvest	Hauling Road Making
Oct.	Roosevelt	Columbus Day	Harvest Hallow'n	Plowing
Nov.	Garfield	Election Day Thanksgiving		Harvesting Housing Building Stops
Dec.	Christmas	Christmas	Winter	Ice Cutting Snow Shoveling
Jan.	McKinley	New Year		Winter Sports
Feb.	Washington Lincoln		Winter	Preparing for Next Season
Mar.	Cleveland	Presidential Inauguration St. Patrick	Spring	Planning for Plowing and Building
Apr.	Buchanan		Spring	Plowing, Planting, Gardening
May		May Day	Spring	Planting Building

FIGURE 3.

The person outlining a course of study should investigate the local (state) conditions. The holidays will be found to vary in the different states, and in some schools exercises are provided by law for certain occasions of state interest.

The various games played by the children should be used as a basis for parts of the outline.

It is because applications must be made to local conditions, if good teaching is to be done, that the teacher should organize teaching material. Where adjustments and applications are not made in local districts, the supervisor may be regarded as the only essential organizer. Such a condition, however, usually results in stereotyped, and often lifeless courses, which are little more than lists of sequential projects. Such a plan also very often develops teachers who are mere

FURNITURE MAKING
GRADE IX

GROUP	PROCESSES	DEMONSTRATION	PROBLEM	SKETCH
I. Review of the fundamental tool processes taught in the grade woodworking, but in accordance with adult and commercial standards.	Mechanical drawing of project. Bill of stock. Problem of cutting up stock board. Cabinet makers' method of working at the bench.	Present cabinet makers method of working at the bench. Explain the free hand working sketch required for the next group.	Stool Tabore Palm stand	
II. A small piece of furniture involving simple joint construction. Skeleton type	Free hand working sketch of project, showing proportions, and giving dimensions. Mechanical drawing from approved sketch. Use of power saw and planer to size stock.	Use of power saw and planer. Talks on constructive design and difficult construction. Economy of labor	Piano bench Umbrella stand Magazine stand	
III. More advanced piece than any included in preceeding group. Introduce drawer construction.	Same as preceeding group. Use all woodworking machines. Do as little bench work as is practicable.	Study of the uses, structure, and classification of the different woods. New construction details.	Library table Chair Writing desk	
IV. Cabinet involving paneling and door construction. Continue drawer construction	Same as preceeding group.	Cabinet design and construction details. Factory methods. Short cuts used in factory. Most of the time is given to the actual work.	Filing case Wall cabinet Skirt box. Sewing cabinet	
V Finishing. These demonstrations should be given as needed in other groups.	Preparation of wood. Staining, filling, waxing varnishing, mixing stains. Fuming.	Stains- water, oil, spirit, fuming, other chemical actions. Fillers- liquid, paste Varnishes- shellac, copal.	Refinishing a piece.	

FIG. 4. EXAMPLE OF A TEACHER'S COURSE OF STUDY.

teaching mechanics,—people who do what they are told to do but do not think much about what they do.

To organize one's work to permit reasonable adjustments and applications to be made, it is well to build up a course of study about an "Important Events Table." An example of such a table is shown in Fig. 3.

By its use the important seasonal events, holiday and community activities, etc., may be emphasized in a course of study.

The Course of Study.

The teacher's course of study should be more than a mere list of projects. It should be the general course furnished by the supervisor and expressing his aim and policy *worked out in detail.* In it there should be an expression of a careful analysis of the tools and processes to be developed and a definite suggestion also of the subject matter of the course with its relation to the activities of the school and the community fully shown. Such a course for Furniture and Cabinet Construction is shown in Fig. 4.

Here the course is developed on the basis of groups, each one of which stands for a single one, or a few fundamental processes. It will be noted that correlations are indicated, and that latitude of choice in the selection of projects within groups is allowed. Thus the applications and adjustments can be made for individuals depending upon the peculiar abilities of each. Also, the peculiar community activity may be emphasized in projects, for so long as the fundamentals of any group are applied, the project should be limited almost wholly depending upon the technical ability of the pupil.

A more abbreviated course of this kind is shown in bulletin 546 of the high school series, University of Wisconsin. More elaborate courses of this general type are given in book form in Ira S. Griffith's Correlated Courses, Manual Arts Press, Peoria, Ill., and in F. C. Whitcomb's pamphlet on Cabinet Making put out by Miami University, Oxford, Ohio. Perhaps the first and most scientifically developed course of this kind is the original one in Sloyd, the analysis of which is given in Chapter 13 of Herr Saloman's book on the Educational Theory of Sloyd. A course in paper and cardboard work is developed upon this same basis in Buxton and Curran's Book-Paper and Cardboard Construction.

The point made in giving the preceding examples is that a most important part of the organization of teaching material is the arrangement of a course of study which represents *a detailed analysis of tools and processes* and which makes *suitable applications for individual aptitudes and community activities.*

The Daily Plan.

Having developed a suitable course of study the teacher is confronted with the problem of organizing blocks or sections of the course for daily classroom use. Below is given an example of such a daily plan.

Sample of Teacher's Daily Plan.

(To be made out from term course of study.)

1. Have class meet at demonstration bench.

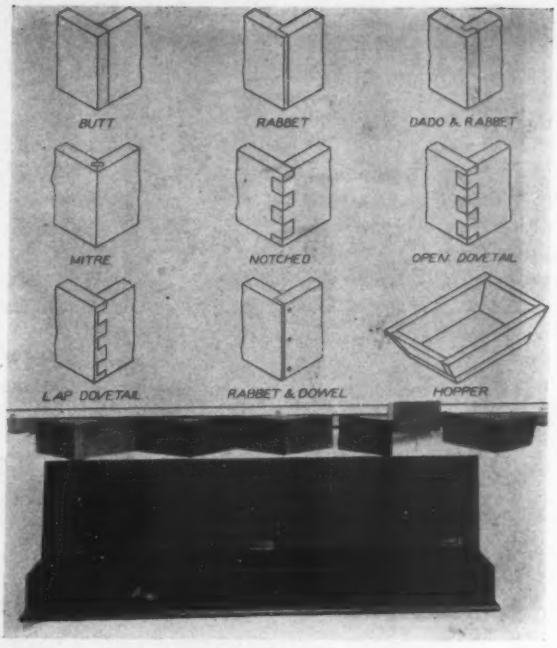


Fig. 5. Demonstration Chart and Models.

2. Review (by questions and answers) points made in last demonstration and in corresponding reference reading.

3. Summarize successes and failures of class during work of last class period.

4. Repeat points in last demonstration upon which class, as a whole, failed.

a. Securing point edge quickly.

b. Handling marking gauge.

c. Splintering edge when blocking end of board.

5. Give new demonstration, "Complete Planing," or necessary portion of it to emphasize "order of planing" and method of securing *width, thickness* and *length* without running under gauge lines. (20 minutes.) (See : Sample of Outline of Demonstration.)

6. Hand out stock for top of trestle and send class to benches.

The value of the daily plan to the maker is twofold. First, it crystalizes for him the best thought which he has upon the utilization of the class hour. Second, it definitely organizes the work of the hour so that for both pupil and teacher there is the least possible waste of time. The plan made is likely to be the best one possible under the conditions for it has been projected with thought and deliberation. It results in a purposeful or business-like attitude on the part of the instructor. This is contagious. The pupils, inspired by the atmosphere of work, have confidence in their instructor and faith in their own ability. They enter upon their work with zest.

The Demonstration.

Most important in the "Daily Plan" perhaps is the Demonstration.

It is the outline of the teacher's performance before his class as a whole, when he has them assembled as a

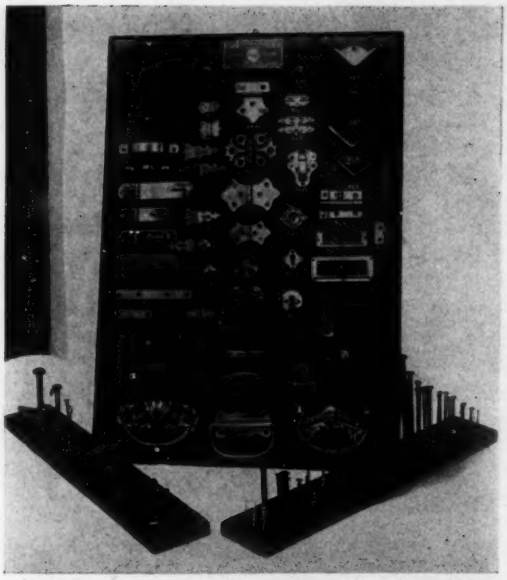


Fig. 6. A Sample Exhibit of Hardware,

unit, to witness his method of exhibiting the work which he wishes them to do and as he wishes them to do it.

The demonstration must be so well organized, as a result of the teacher's having both thought it out and actually gone thru it in preparation for his class, that it presents in the most forceful way the few—very few—leading consecutive points which are of *primary interest to all members* of the class. It is the result of a very careful practice of selection and rejection of material on the part of the teacher.

While giving it he must make no lost motions. He works and talks simultaneously, doing with his hands principally those things which are dictated by the class as the result of a question-and-answer or developing plan. He fashions material precisely and speaks only of those things which will emphasize, more than the hand alone can, those operations which he wishes to fix in the mind of the class.

Every demonstration can be divided into three chief parts, viz:

1. The statement of the problem.
2. The methodical doing of the demonstration.
3. The summary of the things done, or the review.

No. 1 is made most effective usually by the presentation of a completed or partially completed project accompanied by a good drawing, preferably in chart form, of the work to be done in the demonstration. (See Fig. 5.)

No. 2 makes its strongest, and only constructive appeal, when the demonstrator is a master at the work he performs.

No. 3 prepares the pupil immediately to carry out the work of the demonstrator when, as an individual, he undertakes the same or similar work. It may often be most helpful to the individual student if he writes down in a notebook the exact statements of the instructor as dictated by him.

These statements must be such as to clinch the main sequential points in the demonstration. For this purpose the instructor should place the summary review statements upon the board or dictate them for copying.

Sample of Outline of Demonstration.

Complete Planing.

1. Material: One soft pine board machine dressed to 20″x6″x15/16″.

2. Tools: Exhibit of planes in common use: jack, smooth, jointer and block.

3. Brief statement of the use of each plane exhibited.

4. Statement of order used in planing a board to length, width and thickness.

Order No. 1: Face side, joint edge, gauge for width on face side, plane second edge, gauge for thickness from face side on both edges, plane second surface, block one end square with face side and joint edge, measure for length and square about board with knife, saw to line and block second end.

Order No. 2: Face side, joint edge, block one end, measure for length, square about board with knife, saw to line and block second end, gauge for width on face side, plane second edge, gauge for thickness, form face side on edges and ends and plane second surface.

5. Plane face side. Emphasize:

a. Importance of length, width and diagonal testing for flat surface.

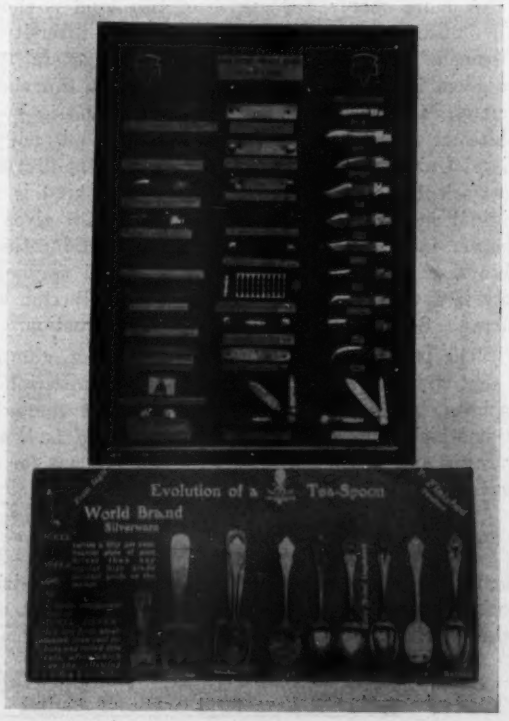


Fig. 7. A Sample Industrial Exhibit for a Manual Training Shop.

b. Importance of and method of planing dished surface, bowed surface and warped surface.

6. Plane joint edge. Emphasize:

a. Importance of watching gauge line.

b. Testing often with straight-edge and try-square.

c. Reducing thickness of shaving for last few strokes of plane.

7. Gauge for width and plane second edge. Emphasize:

a. Necessity of perfect edge when gauge line is reached.

8. Gauge for thickness and plane second surface. Emphasize:

a. Points made in No. 5 and No. 7.

9. Block one end. Emphasize:

Sample Instruction and Review Sheet.

(Possible method of "fixing" points in demonstration. To be used by pupils early in the semester.)

To Plane a Board to Length, Width and Thickness.

1. Test board to determine direction of grain, etc. How many tests will you make?

2. Plane one surface. Which one? With what? Have you inspected and adjusted your plane? Is it sharp?

3. What surface will you plane second? With what? How will you test it? What will you do if you get it into a "winding condition?"

4. Gauge for width carefully. On what surface? What particular cautions will you use in planing second edge?

5. What will you do next? Why? How will you determine dimension? What precautions will you use to get board to proper and true thickness?

6. Block one end. What should you do first? How much will you "block" off? How will you test? What plane will you use and why?

7. What is left to do? How will you do it? What will you certainly do to get the exact length? Will you block in the vise or bench-hook?

8. Repeat to yourself the order used in planing up the board. This is called the "rule for planing?"

9. What have been your particular difficulties in planing up the board? Do you know how to overcome them now? Bring troubles to class tomorrow.

10. Be prepared to calculate the number of board feet in your board. In a short statement tell in writing how you plane up a board to three dimensions.

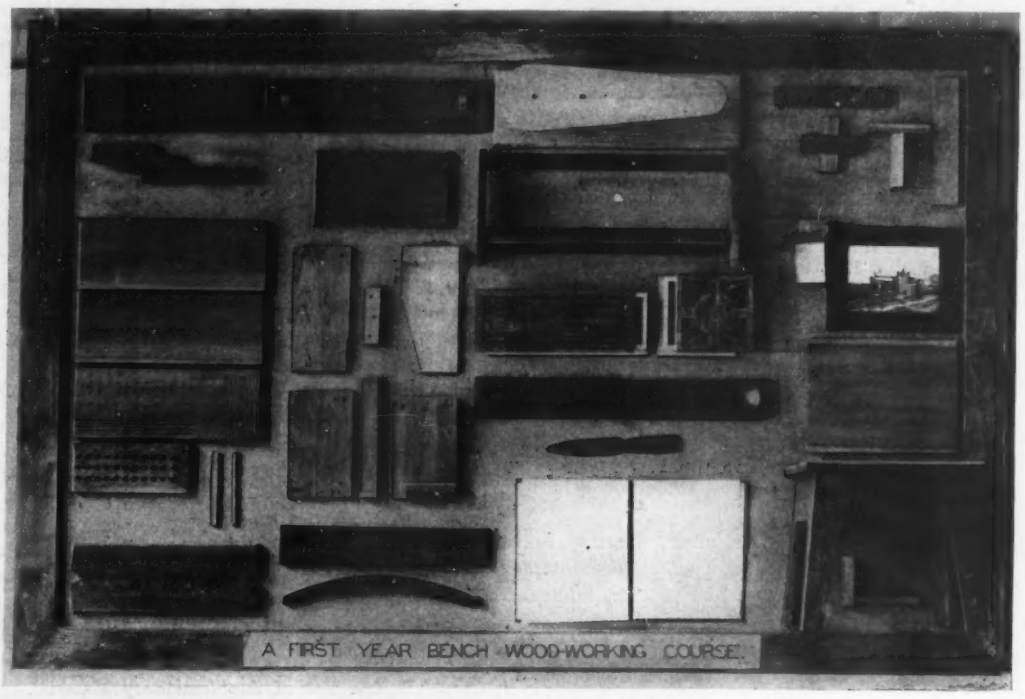


FIG. 8. ILLUSTRATIVE PROJECT MATERIAL.

a. Necessity of first squaring around and sawing to line if end is not approximately square.

b. Sawing in benchhook or vise.

c. Overcoming possibility of splintering edge.

10. Measure for length, square with knife and block. Emphasize:

a. Points made in No. 7 and No. 9.

11. Summarize points for pupil's notebook or for instruction sheets to be handed out for guidance of individuals while at work.

The Instruction Sheet.

Again a follow-up or instruction sheet may be prepared by the instructor to hand out to members of a class just preceding their individual work. A sample of such a sheet given out following a demonstration on complete planing is given below:

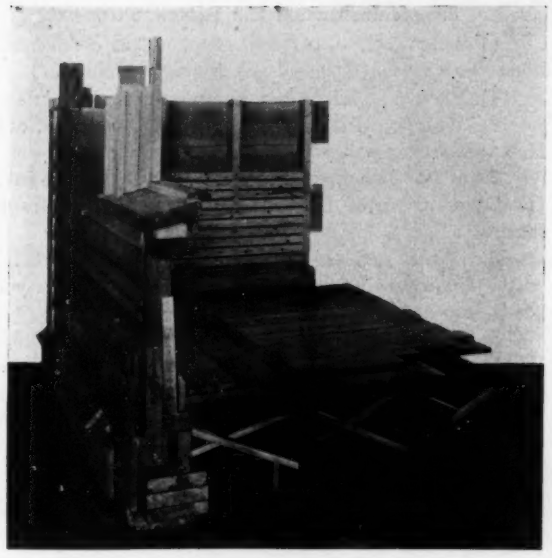


Fig. 9. A House Framing Project Exhibit.

Systematic Individual Instruction.

Important as the well-planned and carefully given demonstration is, it is not more important at least than the systematic individual instruction which follows it. Perhaps too often the instructor spends the major portion of the class period, which should be given over to individual instruction, in a haphazard way. Thus, utilizing the instructor's time in this important work, may be characterized by the expression "keeping open shop." He depends entirely upon his demonstration to give all necessary information to each and every member of the class, and, consequently, pays little attention to individuals while they are at work unless asked for help by them.

Or the over-conscientious teacher, fearing that some individual will not do exactly what the demonstration taught, passes from one pupil to another, immediately following the demonstration and continuously thereafter until the end of the class period. With each one, and for him, he actually does some work which it would be better if the pupil did for himself.

Such careless attention on the one hand, and slavish help on the other, suggests the planning of an instructor's time for the class period. The following is a suggestion for such a plan:

Instructor's Plan for Class Period.

1. Presentation of the class period work by means of a talk, oral quiz or demonstration, or by means of all, or any two of these means in combination.

2. The definite planning by the pupil and the approval by the instructor of the pupil's plan, problem and his means of beginning the solution of it.

3. The close observation by the instructor of the work of the class *as a whole* without his assisting any individual until each pupil has had time to adjust himself to the work in hand.

4. The helping, by the instructor, of certain individuals who are evidently falling into very incorrect habits of work. This may be done at times by calling together a group of those who are making common errors.

5. The continued class observation by the instructor who scrutinizes each individual's operations by systematically making tours of the class. He renders assistance here and there by means of a leading question, a short concise statement, or a little work on the pupil's project, depending upon which is most needed to make the pupil solve his own difficulties.

6. The approval or disapproval of the result of the original first plan of the individual who reports to the instructor when he has finished the work contemplated by the first plan. At this time the instructor considers with the pupil his plan for the next step. This in turn is to be worked out by the pupil, who ceases work when it is completed and a new plan is to be developed. He then again reports to the instructor for his approval of the second plan when the work upon it has been finished, and he asks also for a consideration of his third plan.

By such a process the instructor, except for the first few minutes following the demonstration when he is observing from some convenient point the class as a whole, is constantly moving about the room offering encouragement to all and assistance in one form or another to the individuals most needing it. For the most part each pupil remains at his own desk or bench, working out the plan which he and the instructor have together agreed upon, or in making a new plan for the consideration of the instructor before he puts it into operation. The instructor is always in constant communication with his class and he always knows, for at least a few minutes in advance, just what each pupil is doing and at what point he will report upon his work and present a new plan for the next succeeding step in his work.

Such an organization of the class period is of supreme importance as it insures a mutual systematic procedure upon the part of both pupil and instructor, while at the same time it develops both initiative and independence on the part of all class members.

The Use of Supplementary Material.

A strict adherence to the plan of the above organization for the class period precludes the possibility of taking into consideration some of the important features of manual and industrial-arts instruction of a supplementary character. There is constant danger in any special line of instruction of confining one's time and effort to a routine performance and thus overlooking many opportunities for experience of quite as much value as that secured in the regular class work.

Teaching manual and industrial arts must not be confined merely to the making of objects out of some material if one expects to derive from this branch of school work the benefits of all its possibilities. An instructor may well plan his term's work under such general headings as the following, not included in the actual handwork of pupils:

1. Talks upon:
   a. methods,

b. tools and equipment,
c. supplies,
d. industrial processes and practices.

2. Demonstrations with:
   a. tools and machines,
   b. upon processes and projects.
3. Excursions to drafting rooms, factories, shops, stores, mines, etc., etc.
4. Discussions upon:
   a. work under construction,
   b. new work to be undertaken,
   c. text and reference reading assignments.
5. Reviews of:
   a. work done,
   b. excursions,
   c. readings and reports.

In all of this it will be to the advantage of both pupil and instructor if there are available, exhibits of supplies, tools and manufacturing processes.

Figs. 6 and 7 show some of these exhibits which may easily be prepared by instructors and classes or secured of commercial firms. Figs. 8 and 9 show course of study and project illustrative material. Exhibits of this kind should be available in every manual and industrial-arts department.

Any bit of organization of teaching material which will assist in conveying to the pupil desirable information, and which will create in him a power and a desire to do, is worthy of an instructor's best thought and effort.

PROBLEMS IN DESIGN

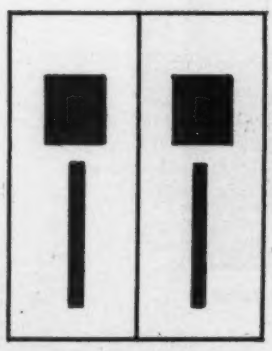
Bonnie E. Snow, Millburn, New Jersey

(Lesson IX)

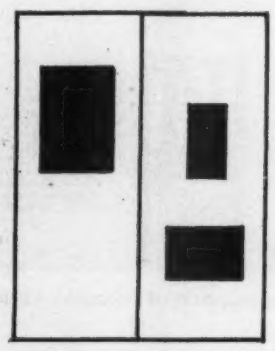
THE principle of balance, continued. In our last lesson, balance was defined as being the result of an arrangement of parts that permits each part to keep its place, without undue emphasis. Symmetry, the most obvious form of balance, was illustrated in a number of ways, and an interesting problem involving bi-symmetric balance, was worked out. But in Nature, as well as in the world of art, by far the most numerous examples of balance are manifest not thru symmetry but thru a far more subtle type of the principle. In attempting any discussion of the different manifestations of balance, it is well to revert to the laws of attraction in physics. They are: (1) Equal attractions balance each other at equal distances from the center (as illustrated in all bi-symmetric arrangements) and (2) Unequal attractions balance each other at distances from the center in inverse ratio to their power of attraction; that is, the smaller the object, the greater must be its distance from the fulcrum, or center.

Let us try to make these laws more clearly understood by means of simple diagrams. Fig. 1 represents an arrangement in perfect balance and symmetry. The two shapes on the left side of the vertical axis are balanced by two other shapes, exactly like them, placed equally distant from the axis on the right side. Fig. 2 shows another arrangement, also in perfect balance, but showing that equivalence of attraction has been attained not by repeating similar shapes, but by arranging the shapes in such a way as to obtain a feeling of rest without the use of bi-symmetry. We see, then, that in these two diagrams two different forms of balances are manifested,—bi-symmetric balance, and a balance of unequal attractions. Let us consider more fully and in the light of further illustration this second and more subtle form of balance.

The balance of unequal attractions. Fig. 3 repeats in its essential elements the diagrammatic facts of Fig. 1. It is a decorative flower arrangement, in perfect balance and symmetry. But the arrangement shown in Fig. 4 is balanced just as perfectly, altho the elements on either side of its axis are irregular in arrangement and unequal in size and shape. How is this equivalence of attraction obtained? It is by calling into service all parts of the space,—the background shapes, the leaf shapes and the flower—and making such disposition of these parts as will result in perfect orderliness and adjustment.



1. A Bi-Symmetric Balance.



2. A Balance of Unequal Shapes.

3. Another Example of Bi-Symmetric Balance.

4. A Balance which does not make use of Bi-Symmetry.

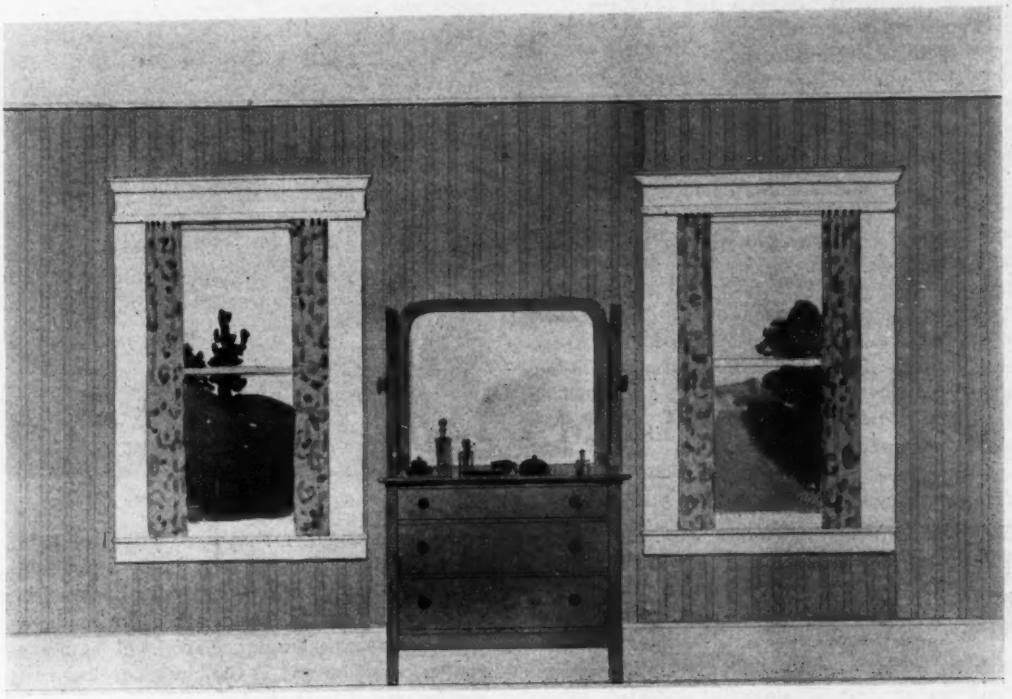


FIG. 5. A SIDE WALL OF A ROOM, SHOWING BI-SYMMETRY BALANCE.

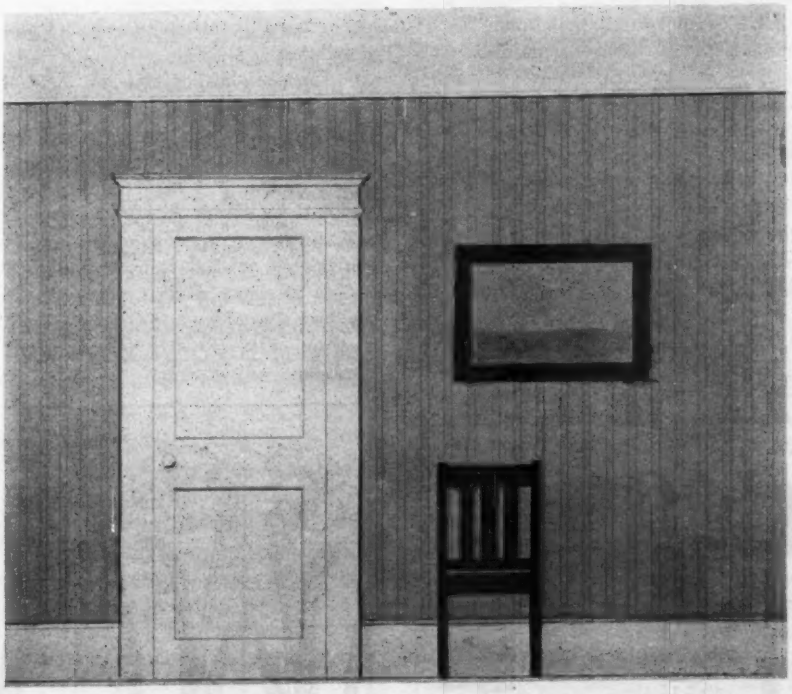


FIG. 6. ANOTHER SIDE WALL, SHOWING A BALANCE OF UNEQUAL ATTRACTIONS.

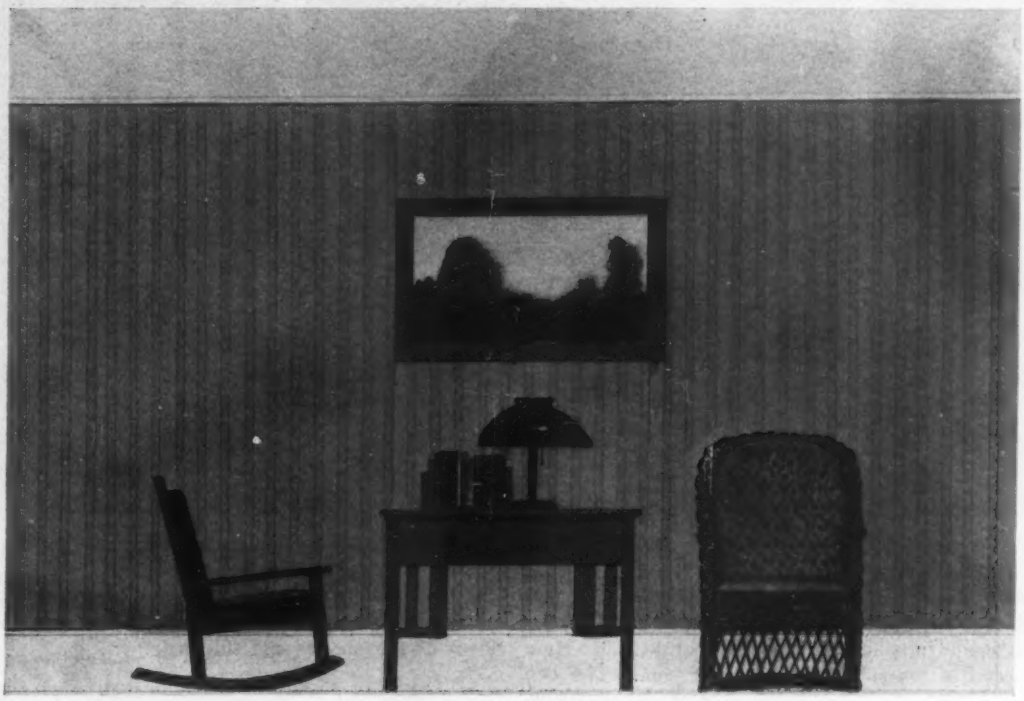


FIG. 7. BALANCE, WITHOUT SYMMETRY.

Details of Dimensions.

Room—Length	14′	0″
Width	11′	0″
Height	9′	0″
Base board		9″
From base board to bottom of window		12″
From edge of wall to side of window	1′	9″
Window Frame—Height	5′	6″
Width—Two windows	6′	6″
Window Frame—Uprights—width		6″
Bottom—width		4″
Top—width		8″
Sash—width		1½″
Door—Height	7′	0″
Width	3′	4″
Width of frame		5″
Width of door	2′	6″
Width of top		8″
Dresser—Length	3′	6″
Width	1′	10″
To top of dresser	2′	11″
To top of mirror	2′	6.
Frame		2″
Frame top		1″
Frame bottom		3″
Drawer—Two top		5″ wide
Two lower		7″ wide
Chair—Height of seat	1′	5½″
Width of seat	1′	3½″ square
Height of back from floor	3′	
Frame—legs—about		2″
Table—Length	3′	7″
Height	2′	6″
Thickness of legs		2″
Width of drawers		6″
Book shelf—wide		8″
Book Shelf—high		12″
Thickness of stock		1″
Rocker—From rocker to top of seat	1′	1″
Seat from front to back	1′	10″
Length of rocker base	2′	10″
Height of back	2′	

FIG. 9. A ROOM INTERIOR, SHOWING A BALANCED ARRANGEMENT OF UNEQUAL ATTRACTIONS.

In room arrangements the question of balance in the adjustment of architectural features and of furniture is wonderfully important. Look at Fig. 5. Here we see one of the side walls of a bedroom. The two windows are balanced on either side of an imaginary vertical axis, and one of the important pieces of furniture in the bedroom has been placed in the center of the space, between the windows. This produces balance and symmetry. But when the architectural or constructive features of a room are so placed as to make a symmetric arrangement impossible or undesirable, we must still obtain balance by the right disposition of furniture and of decorative features. Fig. 6 shows how this has been done, in arranging another side wall of the same room. The large area of the door, placed near a corner of the room, is balanced by the two smaller areas of the picture and the chair.

The right placing of elements such as pictures and chairs is really a matter of importance, and a fine result justifies much experimentation. Balance is restfulness and repose. Without it, the most elegantly furnished apartment is a failure. With it, the simplest furnishings become adequate and satisfactory. If in the present instance (Fig. 6) the picture had been placed twelve inches further to the right, balance would not have resulted. The picture would then seem to pull away from the door and the chair.

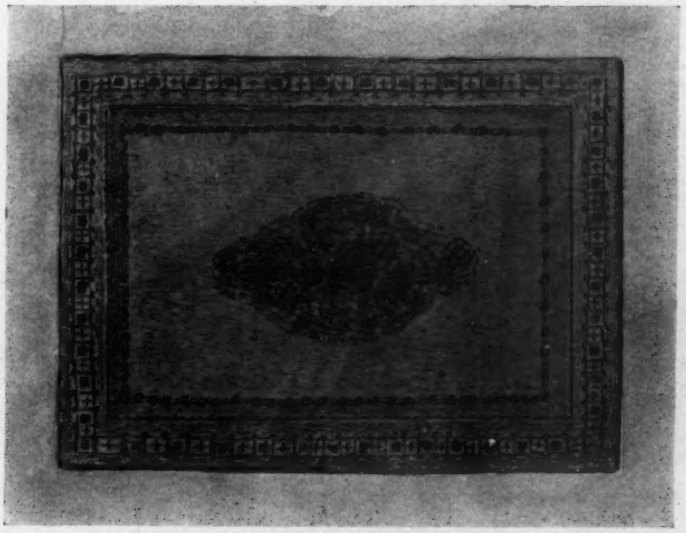


FIG. 8. A STRUCTURAL DESIGN FOR A RUG.
This Design Shows Both Balance and Rhythm.

Still another side wall of the same room is seen in Fig. 7. Here the side wall presents no windows or doors, and we are free to make such disposition of furniture as seems best. Starting with the writing-table placed near the center, we emphasize the center still further by placing a picture directly over the table, taking care that the picture is not too high, for fear of losing unity with the table, and also avoiding a feeling of heaviness or depression by placing the picture too low. This is again a question of balance. Like the chair and the bed and the bowl which little Silverhair selected for use in the house of the Three Bears—"It was neither too high nor too low, but just right!"

Having adjusted our picture to the desk and its furnishings, we next place two chairs of different character, but each answering the purposes of utility. Obviously we do not wish both chairs on the same side of the table; so we balance them at proper distances from our central group, on the right and on the left. A settee, a bookrack, a magazine stand or any other feature might have been selected, instead of one of the chairs.

From these illustrations, we see how important a part the principle of balance should play in the arrangement of a room. Not only must each wall be considered as a unit, with such arrangement of windows, doors and furnishings as will result in balance, but the whole room must be brought to express the same effect of equilibrium. A rug that is too violent in color or a ceiling that is too heavy may destroy the balance of a room whose side walls have been carefully planned. Fig. 8 shows a rug that is suitable for such a room as we have been considering. It is quiet in coloring and flat in effect. Its general tone is darker than the tone of the floor upon which it rests. The walls are lighter than the floor, the frieze is lighter than the walls, and the ceiling is or should be lighter than the frieze. In this way we secure in the arrangement of our room a perceptible upward tendency toward light, giving a feeling of lightness at the top and of stability at the base, as in the structure of a building which carries its solid heavy masses at the foundation and rears its towers and minarets high in the air.

Fig. 9 shows the bringing together of three side walls, a part of the ceiling and a part of the floor of our room. In this final showing some slight adjustment of our former arrangement may be necessary. But in general a room thus carefully balanced in its several parts will present a well balanced and harmonious whole.

The subject of Interior Decoration is so near to the home life of students that its introduction into High School Art Courses is receiving the warmest approval from all friends of "practical" education. In our next lesson we will present a problem in Interior Decoration which can be worked out by High School students with much pleasure and benefit.

ART METAL WORK.
Executed from their original designs by Students of the School of Fine and Applied Arts, Milwaukee Normal School, Mr. Alexander Mueller, Director.

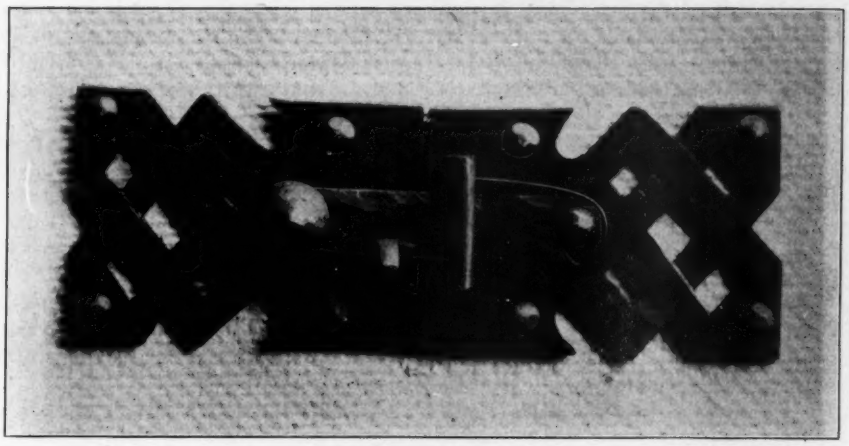


Fig. 21. Door Latch.

ART SMITHING

Thomas Googerty, Pontiac, Ill.

(Third Article)

Exercise No. 5.

Door Latch.—In Fig. 21 is shown a latch for a double door. In Fig. 22 the dimensions are shown of the two plates and the bar latch. In making the plates a piece of soft steel 2 inches wide and ⅛-inch thick is used. The design is sketched on the metal and 5-9/32 holes are drilled in each plate where the square holes

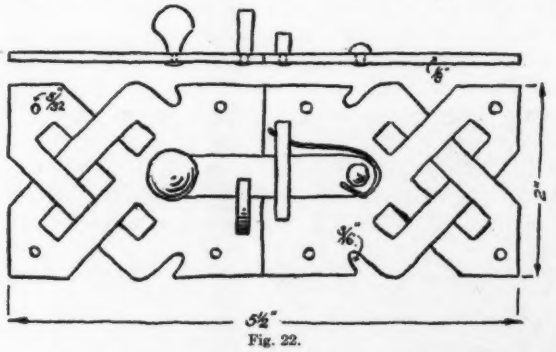


Fig. 22.

come in the design. The plates are then heated and a square punch used to drift out the holes. The outside edges are then cut. The plate is heated and with a square punch the metal is set down to give it the interlaced effect as shown in Fig. 23.

The plates are now filed to straighten the square holes and the holes on the corners for screws are drilled. Fig. 24 represents the catch, which can be made as shown and the knob which is worked out on the end of a rod as shown in Fig. 25. It is hammered on the outer edge of the anvil. After each blow it is turned until finished when it is cut off and the tenon filed. The guard shown in Fig. 26 is cut from a flat piece as represented. The bar is made from ½ x 3/16 stock, drilled, and a slot sawed for the spring. The spring is about ⅛ x 3/32 and can be made from spring steel.

Fig. 27 represents a hinge that can be made from ⅛-inch soft steel. After the design is sketched with a slate pencil on the metal, the open parts are drilled and cut out. The out side is next cut with a chisel and the edges filed smooth. The eye or joint of the hinge is formed without welding; by hammering it

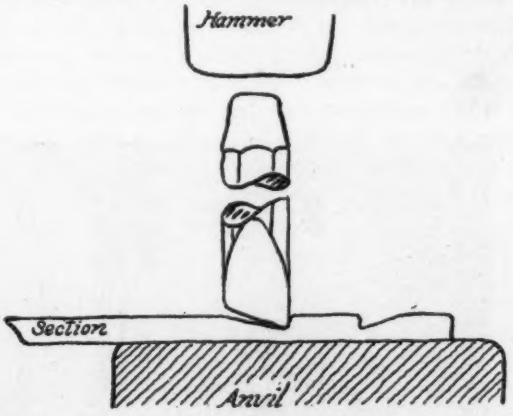


Fig. 23.

around an eye pin of the desired size. The prongs or projections to form the knuckle are filed so that they fit into one another. The interlacing is done with a

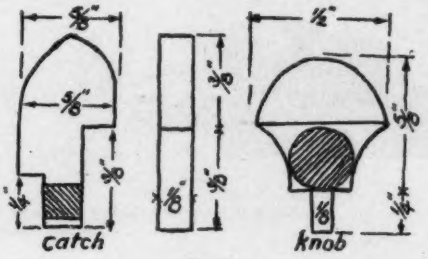


Fig. 24.

square end punch in the same manner as explained for the latch. A great variety of designs of this kind can be made to advantage in iron work. A drawing of a simple strap hinge is shown in Fig. 28. The part of

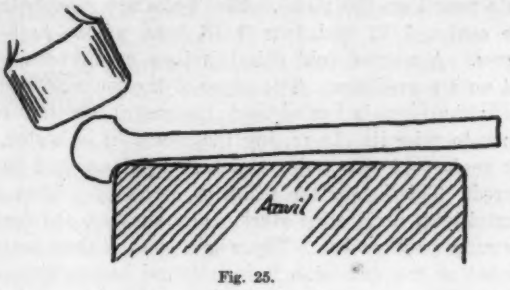


Fig. 25.

the strap at A on the drawing is made greater in length than width for appearance. This gives the strap apparent strength and emphasizes its length.

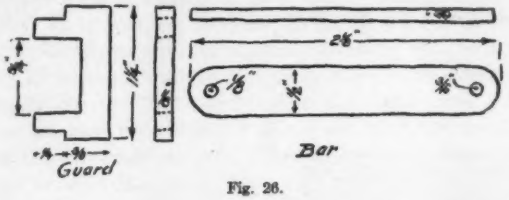


Fig. 26.

The hinge can be made any length desired but should be carefully proportioned; the eye can be made loose or welded. In welding a hinge-eye the lap should always be on the back. Note the drawing of the eye

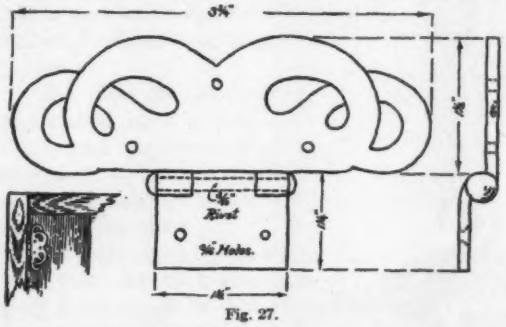


Fig. 27.

ready for welding in Fig. 29. In making hinges, making the eye is always the first operation. A welded eye makes the strongest hinge; but they can be made with a loose eye if desired. In bending and finishing the eye,

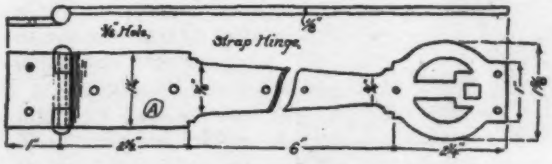


Fig. 28.

an eye-pin should be used to true the hole. An eye-pin is a piece of round steel of the desired size drawn tapering on each end so that it can be driven thru a hole. The projections that form the joint for a loose eye hinge should be cut out before the eye is made. If the stock is light, the joint can be filed or sawed after the eye is turned in either a loose or a welded hinge. In heavy eyes the projections are laid off and marked on the

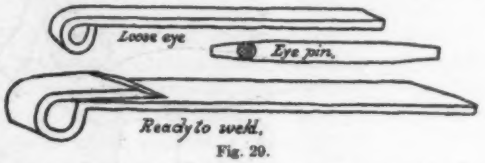


Fig. 29.

metal while flat. The bar is then heated and split lengthwise from one side, starting ½-inch from the end, and cutting long enough to make the eye. The eye is then formed and welded and pieces are then cut out leaving alternating projections which can be filed to fit.

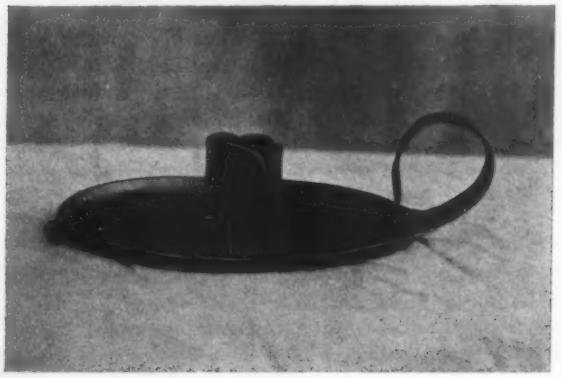


Fig. 30. Candle-stick.

Exercise No. 6.

Exercise No. 6 is a candle-stick. The reproduction, Fig. 30, shows the finished piece. The drawing, Fig. 31, A, gives the dimensions; at B, is shown the pattern of the bottom in the flat. The bottom is cut from a sheet

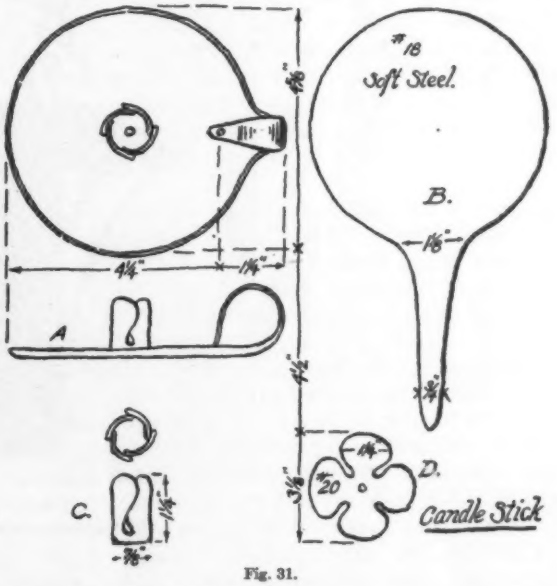


Fig. 31.

of soft steel, using a narrow cold chisel. The edge is then filed and bent up about ¼ of an inch; in doing

so, it is hammered over a round block or iron which

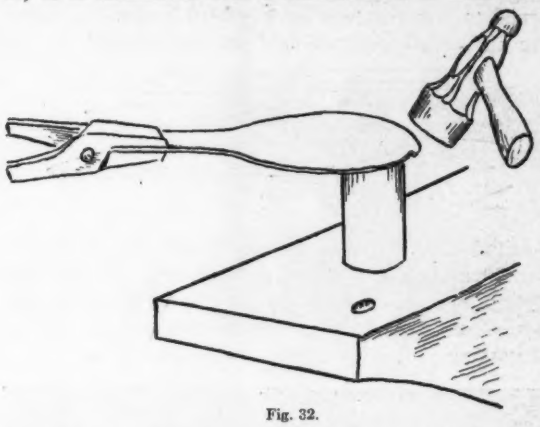
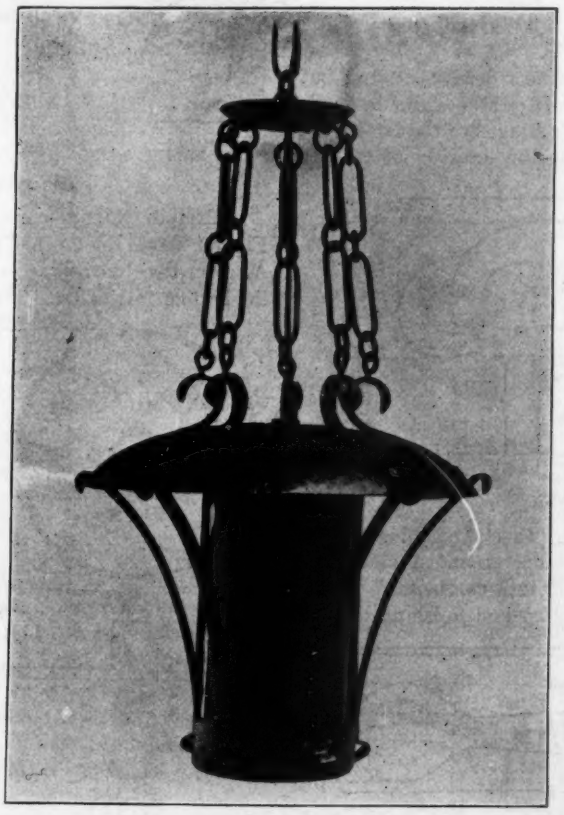


Fig. 32.

fits into the square hole of the anvil, see drawing Fig. 32. The handle is formed by heating it, and hammering it over the horn of the anvil. In making the socket to hold the candle as shown at C, Fig. 31, the piece is cut from number 20 soft steel. At D, is illustrated the stock cut ready for forming.

In cutting this piece, the shape is sketched with a slate pencil on the metal. Five holes are now drilled, the center 5/32 and four 3/16 holes at the base of leaves. A narrow cold chisel is then used which will cut on a curved line. The edges of the pieces are then filed; the piece is heated and hammered on the elm block to raise it. In raising the socket, it is heated in the center, set over a depression in the block and hammered. This brings the wings or leaves up. They are brought up until they overlap one another, the leaves forming a square box. The whole piece is then heated, placed on the end of a ¾-inch round bar, setting the whole into a swage, and the leaves fitted around the bar by hammering. The socket is then riveted in place. A rivet is put in the end of the handle to hold it in place. The candle-stick is now smoothed with a file and smoked over the fire, then oiled.



HALL LANTERN.
Designed and Forged by Mr. Googerty.

MECHANICAL DRAWING EQUIPMENT

Rodney S. Brace, Schwab Technical School, Homestead, Pa.

THE great growth in the use and usefulness of Mechanical Drawing in the last few years has made it one of the most important, if not the most important, of the subjects classed under the head of Industrial Arts instruction. There is no doubt that more real value can be found for the coming generation in the study of this "language of the builder" than in any one other handwork subject. The training is of the kind that will be of practical value in any walk of life aside from the purely cultural and motor value it has in the training of the child.

The equipment for handwork of any kind is the thing which scares most school boards, and well it may if the work of buying is to be left to inexperienced people. It is possible, however, to fit up a room in almost any school, so that Mechanical Drawing can be taught to advantage, with less expense than it is possible to equip for any other subject in the same class. Here we see that the subject which is to be of the most real worth can be furnished for less money than those which are of less educational value.

At the end of this article are two estimates for equipment. One amounts to $100.00 and the other to $800.00. The former could be used with few classes while the latter would be fitted for 240 pupils per week without crowding. Between these two it should be possible to plan an equipment for any school, suited to the number of classes to be taught and to the work expected of them.

The room for Mechanical Drawing should be as large and as light as possible. Room for work is one of the most important considerations. The tables are never small and pupils can do much better work if they are not handicapped by the necessity of confining themselves to little space.

The light should come to the work as in any schoolroom, from the back and from the left. Any other strong light should be shut out unless the tables can be arranged directly under the windows so that there is no chance of the person at work obstructing his own light or that of his fellows. There are very few rooms where a class of any size can be arranged in this way.

No single drawing room in a grade or high school should be planned for the use of more than 25 pupils at one time and no instructor can do his best work with more than twenty.

Blackboards are valuable. They should be hung high and have a raised foot place for the instructor. The blackboard drafting machine makes it possible for the teacher to place work on the board before the class and to continue it in the order which the pupil will follow and with the tools which he will use. This avoids confusion, for when the teacher is obliged to use any makeshift methods there is apt to be a great lack of clearness in the minds of the members of his class.

There are several kinds of demonstrators on the market and any school would do well to get along with less blackboard surface than is usually furnished and, in its place, buy one of these machines. Purchased with the original equipment of a department it would not be an added expense. The one with a roll of paper which can be moved either way and thus preserve the teacher's work, just as it was left from week to week, has by far the best idea. There is another with interchangeable blackboards. Both of these are furnished with instruments similar to those the pupils use.

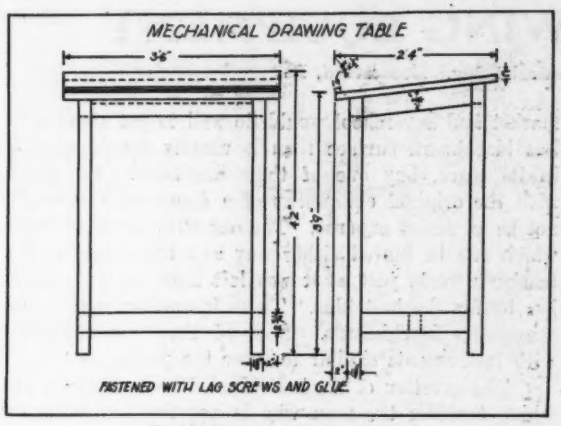
The question of the individual drawing table is one which troubles the man who is not familiar with the problems of equipment. This is the most important single problem in the fitting out of a Mechanical Drawing room. There are three distinct kinds of tables and there is a difference of opinion as to which of the first two is of the most advantage. The question arises because of the accompanying equipment which the second type requires. There is economy of space in using the first type.

The first type includes all those models with cabinets underneath for boards, and drawers for instruments. They were planned at first for the work of the advanced student and had a drawer for each person who was to use the table. A very widely used and apparently satisfactory model has been made, with places for ten boards and with but one drawer just under the table top. The idea is that each pupil will have a board and that the drawer will contain the necessary tools for their common use. There is a hook outside for the Tee square. These tables are more expensive than those of the second type but the storage equipment which must accompany the latter type make up in the price.

The second type covers those solid tables which have no place for storage of any kind. There are many varieties of these tables which vary but little in their usefulness. They are constructed in many ways and the prices differ. With these, and those in the third type, there is the necessity of providing storage place for the boards.

The third type is the adjustable drawing table and covers a great variety of models; everything from the drawing board on trestles to the most complicated table of the architect or landscape gardener. Few, if any, of them are to be recommended for school work. The "saw-buck" style is cheap but hardly durable enough to be considered. Those with complicated adjustments are usually out of order in the schoolroom. The table with the single support under the center is used in a number of places but is best adapted for Freehand Drawing where a table, which can be moved, is an advantage. The rigid table is always best for Mechanical Drawing work. The draftsman can move around his board.

It is necessary to use high stools with the first two types of tables. They are best for many reasons, one of which is that the boy can not slide down in his seat as he does in a chair. If he is to sprawl it must be on



Typical Mechanical Drawing Table.

the top of the table. The instructor can easily correct this. A fairly erect position is to be insisted upon if the pupil is expected to do good work. Experiments with many stools have shown that the one which motormen commonly use, with an arrangement under the seat to tighten the legs by means of wires or rods, is about the best to be found among the cheaper stools. The weight of the various boys soon loosens the ordinary stool and, if there is no means of tightening, the room is soon filled with squeaking stools.

Drawing boards should be of clear white pine and not finished in any way. The thumb tack holes in pine can be closed with a little warm water applied to the whole surface. This cannot be done where there is any stain, shellac or varnish on the surface of the board. Cleats on the ends of boards add to the strength. These are better for school use than boards with cleats on the bottom because the latter take twice the room that they really need. A board about eighteen by twenty-four inches is a standard size for school work. All firms carry a board about this size, or, if there is any reason for a particular size, they will make it.

When any type of table is used which has no provision for storing the boards, a cabinet must be built in the room. One of the best arrangements in use at the present is a cabinet that is also a demonstration table for the instructor. It is about the height of the drawing tables and has cupboards on each side, each cupboard containing the boards for one class. A door looks over the boards and they are safe and clean until needed. A little space between the boards makes a safe place to keep instruments. This idea for a cabinet can be used in several ways. The cabinet can be placed against the wall with doors on but one side, in which case the height can be for one or two sets of boards. Again it might be placed as was the one just mentioned, just far enough from the wall for the doors to open, thus doubling the space for storage with little cost of room and without raising the height. Perhaps the best arrangement would be to have the doors on but one side and place the cabinet across the front of the room with only space between it and the blackboard for the instructor's platform. This is the best place in the room for the instructor to work.

A Mechanical Drawing Table with Drawer for Instruments and Space for Storing Boards.

Part of the furniture of every Mechanical Drawing room should be a filing case for paper and drawings. The sectional filing cases which furniture firms and library supply houses manufacture are most satisfactory for this purpose and can be added to at any time. The drawers should hold standard sheets of paper (19″ x 24″, 22″ x 30″ or 27″ x 40″).

An Adjustable Drawing Table.

A drawing board for each boy is almost a necessity if the best work is to be expected. The same may be said of the Tee squares. The price of Tee squares varies with the quality. It is not necessary to buy the very highest priced ones if there is to be one for each pupil. They should be strong and well made and if they answer these requirements a comparatively cheap grade will do. Of course, it is taken for granted that the supplies are to be furnished by a firm that will not put on the market any goods which are not honestly made.

Triangles which are dependable can be purchased very reasonably. Two of these, one 45 degrees and one 30 by 60 degrees, for each table equipped, are usually sufficient. A set for each pupil has its advantages. Irregular curves are not extensively used in school work. There should be about half a dozen in each room; if the pupils are to do advanced work there should be one for each desk.

These curves are made to suit the work of the

THE "UNIVERSAL" BLACKBOARD DRAFTING MACHINE.

various trades. The "combination" or one which is fitted to a great variety of curves will do as well as a large set for school purposes.

The scale or rule must be carefully selected. The triangular, architect's scale is of little use, for the problems which are given to pupils do not require that kind of a scale. Then with the triangular scale the pupil can easily lose himself in its strange divisions. A flat scale beveled both ways, on the top, with twelve inches divided in sixteenths on one side and one-fourth and one-eighth inch scales on the other is better, for it applies to the work of most school courses. For ordinary grade work a rule of reasonable accuracy is all that is needed. The best plan is to have rules for the younger classes and scales for the older boys who do work where they need a higher grade tool.

The question of drafting instruments is the most important of all and should have a very careful study before a selection is made. Choose, if possible, a brand of tools made by a firm whose name is standard. There are sets to be had under five dollars which fill all the needs of the ordinary school for durability and accuracy. They should be purchased as perfect of their class and from a dependable firm so that those with flaws may be exchanged. In a dozen sets of cheap instruments, there will be a number of pieces that prove poor after some little use. These should not be discarded but returned to the dealer who will gladly exchange them for perfect ones.

The size of the case and the number of instruments should depend on the work that is expected of the pupils. Students in the grades will not do as difficult work or need as high grade tools as the pupils in the high or technical school. A set with a good compass having interchangeable pen, pencil and extension, a pair of dividers, bow pen, bow compass and bow dividers, with one or two ruling pens, will answer the needs of any school where instruments are furnished. Many sets have but two of the bow instruments, leaving out the bow-dividers. This is not a good plan for the bow dividers are the most important of the bow instruments in the work of school pupils. A medium sized pen will do the work tho two, one medium and one small, are better.

There are no cases, for these sets, which will not show wear very soon. The case seems to be the weak point in the buying of cheap instruments. The barlock case has some advantages because there are no flaps. There was a cheap hinged case, with hooks to fasten it, put on the market last year but it was not satisfactory. As yet, there is no case made in imitation of the expensive ones that will stand the test of constant handling. The old pocketbook case, of which there are so many complaints, is the best to be found for the money.

A discussion of Mechanical Drawing equipment would not be complete without some mention of the changing stock, that which must be purchased new every year. This problem is not so serious as the others for the mistakes of one year can be corrected in the next year's order.

The paper should not be of too cheap a grade. The cheap papers will not stand erasing and, for this reason, cause much greater waste and are much poorer for the training of young people than the better grades. Cream or buff papers keep clean longer than the white and should be used for most school work. White paper can be used to advantage where the pupils are to do special work. In specifying paper, use the manufacturer's and not the jobber's name for it. There is less care taken with those papers made to special orders for small firms than on the ones with a standard to maintain.

The pencil is another study. The best pencils are too good, if that is possible. For reasons of health it is best to have a pencil for each pupil and what is desired is a pencil that will last one pupil for one year's work. Now there are pencils on the market that will do more than that and what is left is waste. There are cheap pencils and to buy them is even greater waste for they will not last more than half a year and some of them not more than a day. Strike a happy medium in pencil buying. Every firm has a pencil that it can recommend both as to durability and price. They should have one

to just fill this need. Buy a pencil that will make a line, easily erased when drawn with a chisel point and firm and clean when drawn with a needle point. This will be four or five degrees of hardness according to the make of pencil.

Thumb tacks should be brass or steel with soldered heads. Punched tacks are not durable. Erasers are necessary. A good soft rubber for general work, an eraser for ink and a very soft piece for cleaning, such as art gum or sponge rubber, all help to make the paper clean and neat.

Below is as cheap an equipment as could be recommended. It should be treated only as a start. The instruments including the Tee squares, triangles and drawing boards are good and would be of lasting quality. This estimate contains the supplies for the use of 24 pupils for one year:

24	sets of instruments (cataloged at $4.00)	$ 50.00
24	drawing boards, 18″ x 24″	16.00
24	Tee squares, 18″ fixed head	6.00
24	30 x 60 triangles, transparent, 9″	6.00
24	45 degree triangles, transparent, 8″	6.00
24	¾ oz. bottles India ink	3.00
6	doz. 5H pencils	3.00
24	ink and pencil erasers	1.00
6	cleaning erasers	.40
200	thumb tacks	.60
500	sheets drawing paper, 15″ x 22″	8.00
		$100.00

To this furniture should be added as soon as possible. In most schools the following would be enough:

24	plain tables (like drawing)	$160.00
24	stools	24.00
1	cabinet for 24 boards	16.00
		$200.00

Here we have for $300.00 a permanent equipment for 24 pupils and a year's supplies. To use the same room with more classes would add about $2.00 per pupil for the permanent part. The average annual cost per pupil, with one lesson a week, is fifty cents for material and from ten to twenty cents for breakage.

To equip for the maximum number of pupils who should use one room, the following $800.00 estimate is recommended:

24	sets instruments (cataloged at $10.00)	$150.00
240	drawing boards, 18″ x 22″	150.00
24	Tee squares, 20″ maple, ebony lined	25.00
24	best transparent triangles, 30 x 60, 8″	10.00
24	best transparent triangles, 45 x 45, 9″	10.00
24	irregular curves	10.00
24	tables with drawer for instruments and space below for ten boards	300.00
24	stools with device for tightening	25.00
1	filing cabinet, 3 sections of four drawers with base and top	50.00
1	blackboard drafting machine or demonstrator	$25.00 to 60.00
24	flat scales with white edges	10.00
		$800.00

Two hundred dollars should be ample to cover the annual expense for supplies and breakage for 240 pupils.

There is hardly a school district of any size that could not afford to have some Mechanical Drawing in its courses and there is hardly a limit to the amount that might be spent to good advantage in the equipment of such a room. School boards should set aside as much money as possible for the work and see what can be done with it. The advantages to be obtained are too great to be lightly put aside.

ART is craftsmanship plus inspiration; and inspiration is the rush of unconscious memory along channels made by a habit of craftsmanship.

H. WILSON.

Construction Work in the Lower Grades---Weaving

Fred L. Curran, Instructor in Primary Handwork at the Stout Institute, Menomonie, Wis.

AS a handwork subject in the first four grades weaving ranks as one of the most interesting to the children and is a subject which the regular teacher may handle well with a little study and preparation. The necessary equipment and materials are easily obtained, and a course may be given for a portion of the year at slight cost. The purposes of this article are,—first, to suggest problems which are suitable for each of the first four grades; second, to explain and illustrate the various processes involved in the making and stringing of the looms as well as the weaving itself; and third, to add a few suggestions which may be of some help to the teacher of handwork. The weaving problems which are shown in the illustration were made by pupils in the public schools in their regular handwork course. The work was taught by the regular grade teachers.

The principal forms of weaving taught in the public schools are, (a) rug and mat weaving using the several kinds of yarns, strips of cloth, and raffia; (b) weaving of hammocks, hand bags, dolls' caps, etc., using macreme cord, seine cord, and yarns; and (c) the weaving of mats, using paper strips. The last mentioned form of weaving will not be considered here.

The yarns usually used in rug weaving are chenille, cotton roving, Germantown yarn, wool warp, and rug yarn. These yarns form what is termed the woof in weaving and the regular cotton carpet warp is used for the warp threads. Of the yarns mentioned the chenille, wool warp and the Germantown yarn seem to be quite satisfactory for all grades of work. The cotton roving is too coarse for weaving in small figured designs. The cheap rug yarns which are usually bought for school work, are not strong enough to be satisfactory. The most economical yarn to buy is the wool warp costing less per pound than any of the others; it can be used in weaving almost any of the problems. For the weaving of dolls' stocking caps, tam 'o shanters, and sweaters the four-ply Germantown yarn is very satisfactory. The wool warp may be used for this work but does not give as good a finish as the Germantown yarn. Hammocks and hand bags are usually made with the macreme or seine cord. For variety the macreme cord may be used lengthwise in making the hammock and Germantown yarn crosswise. Sometimes the hammock is made by tying the cord instead of weaving it.

The values of such weaving as is herein outlined are:

a. It acquaints the pupils with the various materials and their names.

b. It furnishes a means of development of hand and mind.

c. It provides an opportunity to teach color harmony and design.

d. It enables the teacher to make more real the facts of industrial production.

The following is a suggestive outline in weaving for from twenty to thirty lessons with 25 or thirty minutes given to each lesson. In the first and second grades one problem under "a" and one under "b" will be about all that can be done in the time indicated.

First grade

a. Square or oblong mat, or holder. One color.
b. Tam o' shanter or doll's hammock.

Second Grade

a. Small rug with simple band border. Two colors.
b. Stocking cap, doll's sweater, marble bag or hand bag.

Third Grade

a. Making design or rug on drawing paper 9″x12″.
b. Weaving rug with simple border and center design. Fringe may be put on if desired.

Fourth Grade

a. Making design for rug which is to be woven on the 9″x12″ loom. This design should be somewhat more difficult and better than the third-grade problem.
b. Weaving rug which has been designed.

General Suggestions for Teaching Weaving.

Before beginning to weave, the children should wind the yarn from the skeins into balls from two to three inches in diameter. As each ball is finished, the end of the yarn should be fastened to prevent its unwinding and getting tangled with yarn from other balls. These balls of yarn should be kept in boxes,—preferably one color of each kind in a box. Yarn should be handled as little as possible while in the skeins because of the tangling and waste which invariably follows. In the first and second grades the teachers should control the selection of colors. Sometimes this is done by having all the pupils in one row use the same color. In the third and fourth grades it is usually better to have each pupil exercise some judgment in the selection of colors to suit the design he has made.

The material should be passed and collected quickly and quietly, and in order to do this the teacher will need to pay some attention to the organization of the handling and storing of the tools and materials. Having each pupil's name on a tag, which is tied to his loom, will save much time in the passing out of the looms at the beginning of the period.

When the children are at work the room should be orderly with very little noise caused by the rattling of the looms and dropping of needles. The mind of each pupil should be upon his work and he should be urged to do his best and accomplish as much as possible in every lesson.

Directions for Making First-Grade Problems.

Square or Oblong Mat or Holder.

The oblong mat shown in cut is made on a pasteboard loom about 4″ by 6″. (See Fig. 1, "A".)

Directions:

1. Make cuts at both ends of the loom with scissors or knife about ½″ apart.
2. Beginning at one corner, fasten end of warp in the outer cut and then string back and forth on the top side of the loom. (Do not draw the warp threads tight enough to bend the loom. It is important that all of the threads are drawn to the same tension.)
3. Fasten end of warp in last cut. Always leave one or two inches of warp at each end of the warp to tie to adjoining loop when mat is finished.

at the same time we should show good judgment, be sympathetic, and look for the real results in human development rather than in the articles which the children make.

Doll's Tam O' Shanter.

A circular pasteboard loom is used in making the Tam O' Shanter. (See Fig. 1, "B"—Tam O' Shanter above and loom below.) The size of the loom is determined by the desired size of the finished article. The loom in the illustration is about 5½″ in diameter.

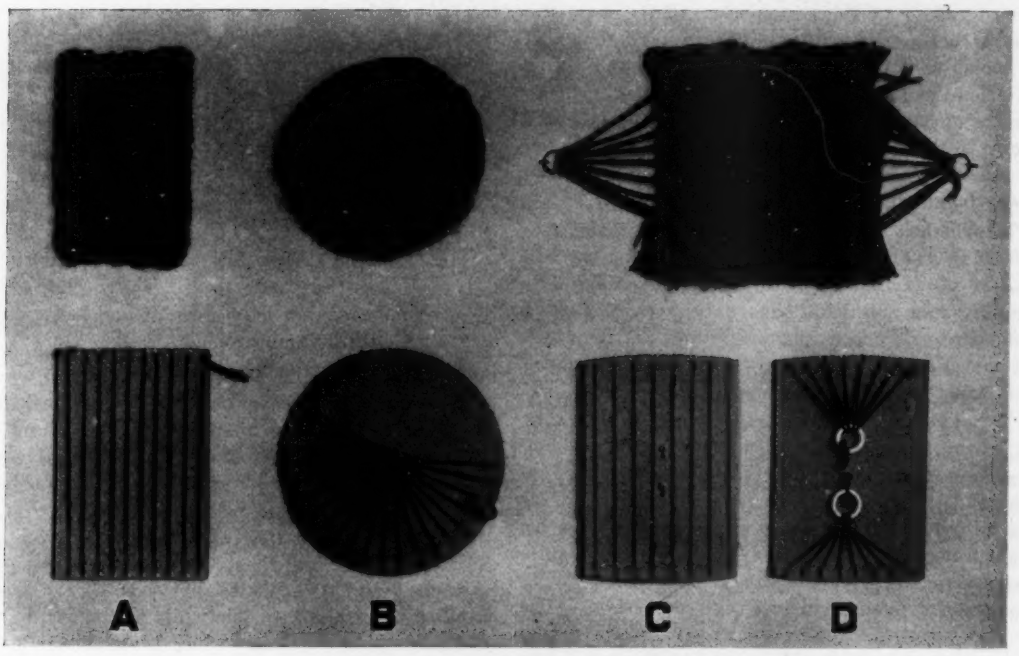


FIG. 1. CONSTRUCTION PROBLEMS FOR GRADE I.

4. Select the desired color of yarn for weaving and break off a piece about two feet long.
5. Thread needle and tie yarn so it will not pull out of needle while using.
6. Start near one end and weave back and forth. Draw yarn carefully each time across to the same tension. Leave a small loop at each side so the yarn, when packed up, will not draw the sides in toward the center.
7. After weaving about one-half of the mat from one end start at the other end and weave in the same manner toward the center. Pack yarn quite tightly in order to cover the warp thread.

In the making of this small mat our principal aim is to get the young children to understand what is meant by "over and under" and to do it reasonably well. Many times they will need to correct mistakes by taking the yarn off and doing it over but since the problem is small and the warp threads are so far apart, they usually do not become discouraged.

Even with these very young pupils, we should encourage them in habits of industry and perseverence but

Directions:

1. Cut loom to desired size.
2. Make cuts about ½″ apart all around the edge.
3. Punch a hole in the center.
4. Break a piece of yarn long enough to string up the loom. (Usually the same material is used for the warp threads as for the woof in this problem.)
5. String loom.
   a. Fasten one end of yarn at center of loom.
   b. Pass from center to any cut on the edge.
   c. Pass back to center on opposite side of loom.
   d. Thru center and out to edge again. Continue this, until the whole loom is strung and both sides look alike. There should be an odd number of warp threads for this type of weaving.
6. Break piece of yarn about 2 ft. long for weaving.

7. Begin at center of loom and weave around. At first we may go over two warp threads and under two because they are so close together. As we weave out and as soon as the warp threads are far enough apart, weave over one and under one. Continue weaving until the outer edge is reached.

8. When the weaving is finished on one side, turn the loom over and weave a band around the outer edge about 1″ wide.

9. Cut the warp threads about ½″ from the inner edge of this band which has just been woven.

10. Tie the short ends of the warp threads together in pairs in order to hold the weaving in place.

11. Push the remaining long warp ends thru the center of the loom and thru the center of the tam o' shanter and fasten these together in the form of a tassel.

12. Break the loom carefully and remove it from the tam o' shanter.

13. With scissors trim all loose ends which may be left.

—Doll's Hammock.

Materials Needed:

One piece of pasteboard 4″x6″ or larger for the loom.

Two small brass curtain rings.

Wool warp, Germantown yarn, macreme cord, or seine cord.

Directions:

1. Cut ends of pasteboard to slightly curved form. (See Fig. 1, "C".)

2. Make cuts in both ends about ⅜″ apart thru which to run warp threads.

3. Fasten the two brass rings in place on the back of the loom. (See Fig. 1, "D".)

4. Cut a piece of yarn cord long enough to string up the hammock.

5. Tie one end of the yarn to one of the rings at the back of the loom.

6. Pass yarn to a cut at one corner of the loom.

7. From this corner cut pass lengthwise on front side of loom to the cut at the opposite end of the loom.

8. From this cut pass yarn thru the other ring on back of loom and then back to the next cut. Continue this until the loom is completely strung up as shown in Fig. 1, "C" and "D."

9. Tie end of yarn in ring when thru stringing the loom.

10. Tie the yarn together close to each ring.

11. Begin weaving at either end, passing over and under the same as in rug weaving. A long loop two or three inches in length should be left in each thread at the sides. This forms the fringe of the hammock.

12. After weaving from one end down nearly to the center, begin at the other end and fill in the remaining space.

13. Cut the loop ends at the sides of the hammock and trim evenly to form the fringe.

14. Cut threads which hold rings to back of loom and remove the hammock. These looms may be used again if they are handled carefully.

If weaving is given for considerable time, all three of the problems mentioned above may be made. But if given for a short time, the teacher should select those which she thinks are most suitable. The making and stringing of the loom in the first grade is usually done by the teacher. The pupils at this age cannot do it well, if at all. In making card-board looms for the tam o' shanter, it is a saving of time to make one loom as a pattern and then to lay out all the others from this.

BASKETS DESIGNED AND WOVEN BY STUDENTS OF THE FINE AND APPLIED ARTS SCHOOL, MILWAUKEE NORMAL SCHOOL. MR. ALEXANDER MUELLER, DIRECTOR.

CONCRETE PROBLEMS

Earle R. Bridge, Galesburg, Illinois

THE construction of posts offers good problems in cement and concrete courses, and brings out to advantage the opportunity for individual problems. The main characteristic of all concrete work, permanence, has a pyschological effect on a youthful builder, because he is thoroly impressed with the fact that the result of his effort is a monument to himself.

Straight-line posts may be made in single, double or compound forms. There is, of course, considerable saving in form material in using a compound form, and where working space is small, offers advantages for class instruction.

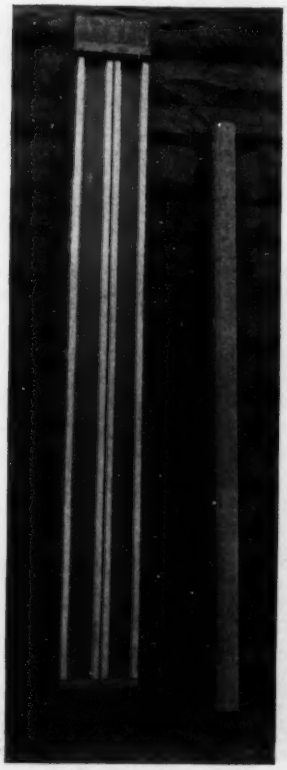
The posts may be made in any form desired, triangular, rectangular, square, round or half round. Triangular posts are perhaps the least desirable, the forms being more difficult to make, and the post when made will not stand the same stress as any other one mentioned.

The most satisfactory posts made in our schools have been those of rectangular type with corners beveled ¾ of an inch. The posts are 7 feet long 3½x5 inches at base, tapering to 3½x3½ inches at top. With these dimensions it will be noticed that the form will have a slant or taper only on one side giving a straight side for the fencing and sufficient support at the base.

We use a compound form, as illustration shows, making six posts in each cast. The material for the form should be carefully chosen, being free from checks and knots. Four 2″x8″x8′ jointed and cleated with 2″x4″ makes substantial base and can be used indefinitely. The boards dividing the posts are of ⅞″ stock 5 inches wide at base and tapering to 3½″, with taper all on one side. Seven boards of these dimensions are required. The end pieces are grooved to hold the dividing boards in proper places. To get the bevel on corners of posts, triangular pieces of moulding are fastened to the base of form. This also holds the dividing board in place. This same moulding is nailed to the top edge of dividing board and forms the bevels on upper side of post. A trowel might be used on the upper edges, but the moulding will produce better results for the beginner.

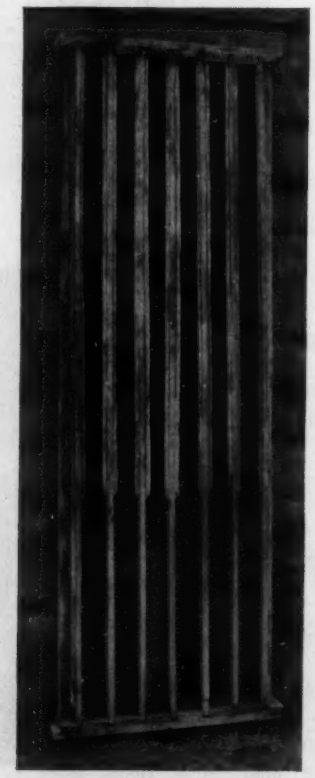
With the dividing boards and the top and bottom boards in place, the form is thoroly oiled. This will not only assist in removal of the posts from the form but add to the life of the form.

The form is laid out horizontally and top end raised by placing on a 1½-inch block. This will level the forms and aid in placing the concrete.



Double Mold and Post Cast in It.

Multiple Mold with Two Partitions Removed to Show Construction.



Multiple Mold Ready for Casting.

The material used for reinforcement and the placement of the same will be one of the determining factors in the usefulness of the posts. Steel rods ¼-inch in diameter or No. 9 wire will make very satisfactory reinforcement. The rods or wire should extend full length of the post, and it is advisable to add extra reinforcement at the ground line.

If ¼-inch rods are used, bend two 14-foot lengths in middle of each post, and in such form that the bent rod will lie inside of the post form and hold its position between ½″ and ¾ of an inch of the sides. If necessary the rods may be held in position by wires.

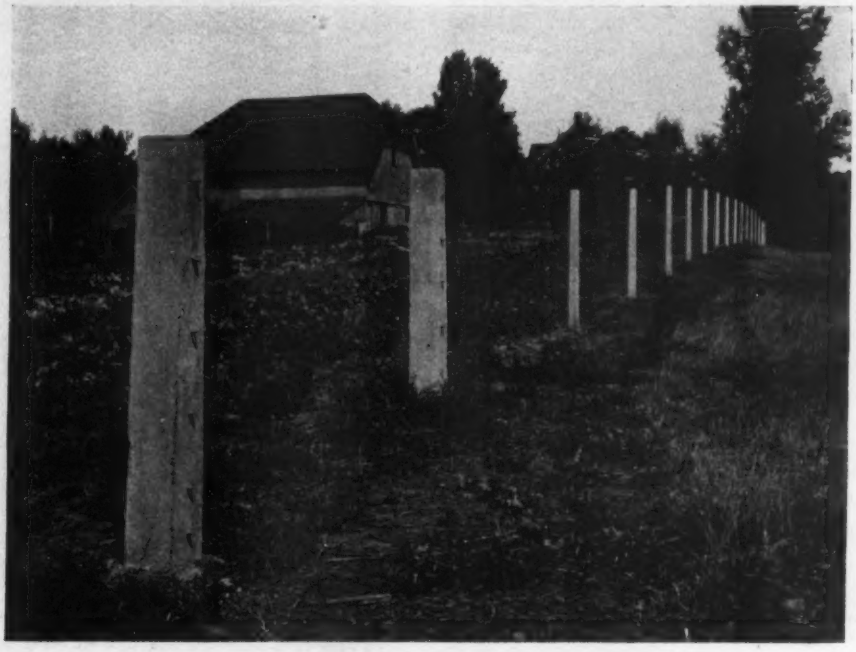
When No. 9 wire is used it will be necessary to bore four holes in the top and bottom of each post end near the corners of the form. Run the wire thru the hole from bottom the length of the posts, thru the top and return thru opposite hole. After the concrete is placed, of which we shall speak later, the ends are all fastened together and drawn tightly. Drawing all at once will give uniform strength to the post.

The mixing of the cement and aggregates in making concrete posts is another important process, because of the small cross section area compared with the weight and strain it must support. The best results are obtained with a 1 : 2 : 3 (C.-S.-R.) mixture. The sand or small aggregate should be clean, sharp and screened thru ¼-inch mesh. The coarse aggregates, crushed rock or gravel should be clean and not larger than ¾-inch.

Spread sand out on mixing platform two to four inches deep and place cement evenly on top of this. This will be thoroly mixed when the mass is of uniform color, add the crushed rock or gravel and enough water to make a medium wet mixture. The consistency of the grout should be such as to insure a bond between the concrete and the reinforcement. A dry or damp earth mixture will "set up" sooner but will not adhere to the reinforcement.

The amount of material to use can be determined by estimating the number of cubic feet in the forms and using the same amount of coarse aggregates. The proportion of sand and cement can be obtained from the amount of coarse aggregates used.

Place about ¾ of an inch of grout in the forms,



FENCE POSTS CAST IN GALESBURG HIGH SCHOOL.

tamping well with the end of a 1″x4″. Then place the lower reinforcement. The grout is added a little at a time and edges spaded to form smooth sides. Keep the material in forms well tamped. When form is nearly filled, place the top reinforcement. If wires are used, now is the time to tighten them and after doing so raise and drop the form several times. This vibration will fill the voids and release the air spaces. The surface is then smoothed with a wooden float.

For wire fasteners, various things might be mentioned. We have used a 3-inch staple with legs bent in opposite directions to serve as an anchor, and placed these at proper intervals in the post. However these are merely temporary as they will rust off after a few seasons.

A safe and satisfactory method with tapered post is to fasten the fence by looping a wire around the post and fencing and twisting tightly. This fence will give a good appearance and is permanent.

Once the forms are filled, they should be covered with canvas, or almost any material, to protect the green concrete from sun and wind. With the exception of a daily sprinkling, the forms should remain undisturbed from ten to fourteen days. This time may seem long, but it is safe, as the green posts are easily cracked

when a little stress is placed on them. At the end of this time, the dividing boards are pulled out and the posts may be laid off to one side, if the form is to be used again. Care should be used in handling the green posts, placing them where they will bear no weight and allowed to cure for 30 days, sprinkling occasionally. Water is necessary to harden the concrete.

The posts in the fence illustrated were made in our Manual Arts Department, and are set in a mixture of grout three or four inches at the bottom of the post hole and an equal amount just below the surface of the ground.

The corner posts were built in position and are anchored by a large base. The form was made above the ground and held in position by braces and the reinforcement placed before the grout was poured. This form was removed the second day and finished with a brush.

Properly cured posts, carefully set, should make a permanent fence and the cost will not exceed that of building a good fence with wooden posts. The fence illustrated cost 25 cents per post, for material. No record of time was made as posts were made in regular class periods, and there were frequent interruptions for discussions, comparisons and explanations.

The cost of materials might be slightly reduced if purchased in large orders. Any intelligent boy, can, with little experience, make a decided change in the appearance of his surroundings by using a little spare time to accumulate a *quantity* of posts.

Hitching posts may be built in two ways. First the complete post may be constructed independent of its final disposal and second, the form placed and post cast in its intended position.

For a serviceable post we make dimensions 8″x8″x5′ setting 30 inches above the ground. The design of post may vary to suit the builder, paneled sides, tapering sides or beveled corners and top.

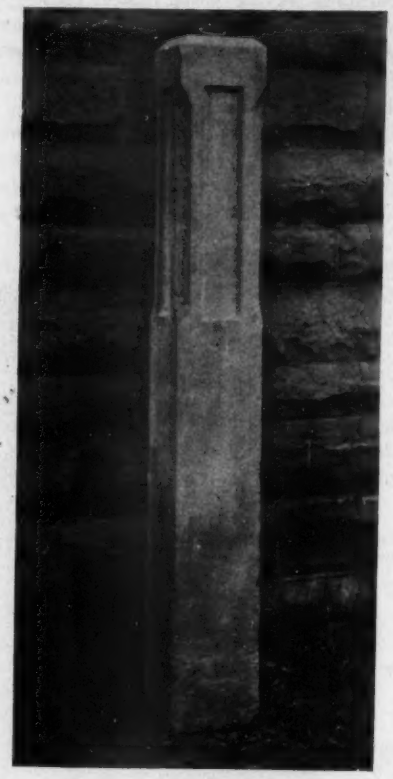
The hitching post being of larger cross sectional area than line post, it may be made of leaner mixture. 1 Cement, 2 Sand, 4 Rock will give satisfactory results.

The reinforcement is placed similarly to the line post and is of ⅜-inch steel with extra pieces placed at ground line.

In casting post independent of its position the form is laid out horizontally. The ring for tying may be placed in top or side by cutting out the form and inserting ring, as the concrete is placed in the form. Keys or clamps are placed at each end and in the middle of form and tightened as form is filled to prevent sides from spreading. After post is cast, it should be covered and cured in same manner as line post.

When post is cast in position it is only necessary to build form above ground. The form should be made of 1½-inch material with inside dimensions 8x8x30 inches. It is well to fasten the corners with ½-inch dowel pins and clamp to hold the panels or other decoration in uniform position. Two pieces of 2x4 nailed at right angles to the base of form and fastened to stakes will hold the form in vertical position.

This post may be cast as a part of the walk with the reinforcement placed thru into the ground, or an excavation may be made deep enough to anchor the post.



Hitching Post.

The reinforcement is driven well into the ground and held in a position from ½ to ¾ of an inch from the form. Mixture is poured in and carefully packed with a small tamper and sides spaded with a finishing trowel.

The form is removed with care the second day and post finished with brush. The hardening process will be accelerated if post is sprinkled daily.

A Majority of us have already entered upon another year's work, and we should derive considerable inspiration and encouragement from the thought that if this vexing problem of Industrial Education is to be solved, it must be by those of us who actually meet the boys and girls in the classroom. Others may write books and give lectures, etc., etc., but the real solution of the problem will take place in the schoolroom or shop.

Writers, lecturers, and other promoters have a part to perform, and while they may win the applause and perhaps receive greater compensation, especially in dollars, than we, let us remember that our part is just as important as any.

In the Report of the National Society for the Promotion of Industrial Education, dealing with the subject of training teachers for Industrial schools, issued last year, is the following, "Stay away from Germany and its schools." No one now doubts the wisdom of this advice.

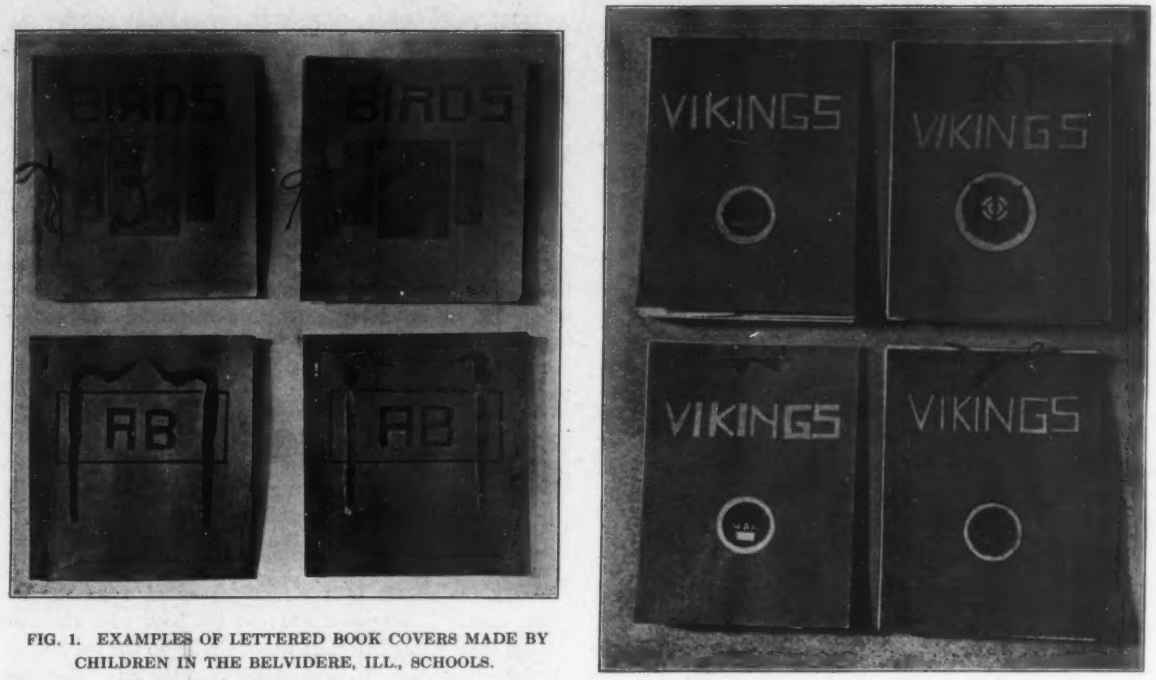


FIG. 1. EXAMPLES OF LETTERED BOOK COVERS MADE BY CHILDREN IN THE BELVIDERE, ILL., SCHOOLS.

LETTERING IN THE PRIMARY GRADES

Lila Irene Lewis, Belvidere, Ill.

TO find a suitable method of applying Lettering to Book-covers in the Primary grades, is a serious problem to more than one of us.

The little tots of the lower grades *could* mark over traced letters and obtain fair results. "Fair" in one way, *"unfair"* in the other, for they would be following in "trodden paths" and never experience the keen, genuine joy of CREATING a "Way."

That is why I have contrived a method of lettering, a way which I find has a touch of the individuality of the pupil and excellent, intelligent results.

The first step is the planning of the cover, margins and the like, and the relative space for the lettering. From this, the height and the width of the letters is ascertained. For example: For the Bird covers, which were made by first-grade pupils, each child was given a paper from which he measured and cut off an inch strip. From this inch strip he cut five (or more) oblongs three-fourths of an inch wide. The letters were then cut from these papers, keeping them uniform in height and width (see Figure 2). When all letters were completed they were carefully pasted to the cover paper. This same method of cutting may be applied to any letters of the alphabet, and, too, we have successfully cut numbers for calendars.

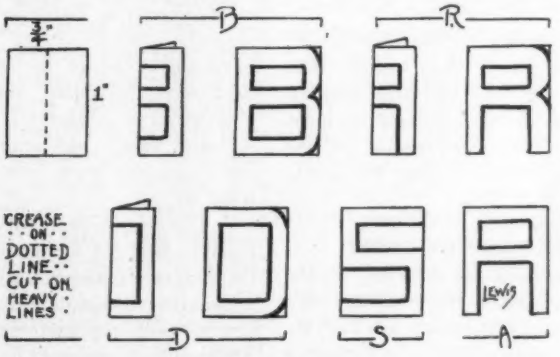


Figure 2.

The cover for the "Ab" stories are by second-grade children; those of the "Vikings," by third graders.

I have yet to experience a lesson of this kind where the children do not obtain good results. Better still is their unrestrained joy, for after all,—what is more gratifying than work well and joyfully done?

INDUSTRIAL-ARTS MAGAZINE

Board of Editors

WILSON H. HENDERSON . . . . Milwaukee, Wis.
E. J. LAKE . . . . . Champaign, Ill.
S. J. VAUGHN . . . . . DeKalb, Ill.

EDITORIAL

A PRESENT OPPORTUNITY.

FOR NEARLY a decade, America has been looking to, and depending upon Germany for her ideas concerning Industrial Education. The only requisite necessary to convince us of the efficacy of any educational method or practice, has been the stamp, "made in Germany." That stamp has now lost its charm, if not its significance. Nothing is now being imported from Germany, and it is extremely doubtful, if anything will come this way for several years.

During the war, Europe is devoting its energies to the destruction of those things which it has required centuries to build and accumulate. Education is at a standstill—Civilization is blindfolded, bound and gagged. When the war is over all the energies of the people must be turned to the re-construction and rebuilding of the material things which have been destroyed.

Hitherto, America has been content to follow, in matters of Education; now we must assume leadership. We must think for ourselves, must develop a system of industrial education peculiarly adapted to American ideas, principles and conditions; one which will not result in social stratification. Our manufacturers are exerting their energies to the making of those things which have hitherto been imported, and they will succeed in what they undertake. In matters of Education, we must do likewise.

America is now fully realizing its need for skilled mechanics and artisans—men with keen minds and trained hands, who can do not only the things which they have been trained to do, but can successfully meet new problems and conditions. In other words, we are now suffering the consequences of neglecting Industrial Education.

THE HEROISM OF THE LOWLY TASK.

WE have become accustomed to thinking of the heroic as related to large, hazardous undertakings of a public and spectacular nature. So much so has the tendency become, that many are inclined to mistake the glitter and the show for the essentials.

A new type of heroism has arisen—the heroism of the lowly deed. It requires greater valor to don the garb of lowly, disagreeable, but necessary toil, than to buckle on the glittering armor of war.

More and more, people of discernment are paying tribute to the men and women who patiently and uncomplainingly do the things which are less showy, yet which are after all, the eternally essential things for material, social, and civic safety and welfare.

Every day we become impressed by the fact of how much of civilization with its blessings is due to the ditcher, the street cleaner, the person at the forge, before the furnace, behind the counter or in the kitchen, if he but does his work conscientiously and well.

The time will come when the worth of an individual will, to a large degree, be measured in terms of vital service conscientiously rendered for the common good. The day of the heroism of unheralded service is dawning.

DOING SCHOOL CHORES.

DURING the past year, much has been said and written in condemnation of the so-called "coat hanger-book rack" type of shop work in the schools. Educators have condemned, in no uncertain terms, the exercise or "model" method of teaching industrial processes. In the place of the model course various schemes for giving the student "real" experiences have been recommended.

In the report of a recent survey of a school system, a plan is proposed whereby the boys who are now doing exercise and project work, shall "do the chores" of the school system. It is proposed that the city *"abandon* the formal teaching of series of exercises in the school shops and substitute instead the doing of short pieces of real work on the school buildings and grounds under the direction of skilled journeymen artisans permanently employed by the department of education to make repairs and alterations. It is not necessary that these men should be trained teachers. They should be skilled artisans, of good character, who use good English and like boys. The work done should be the regular work required for the maintenance and repair of the school plant. The classes should be small, consisting of only from three to five boys for each mechanic and all attempt to fit the work into any preconceived series of exercises should be abandoned."

This plan delegates to mechanics with no training or experience as teachers, the task of training the boys properly. This scheme will afford opportunities to learn something of the work of the carpenter, mason, electrician, tin-smith, machinist, blacksmith, painter, plumber, and steamfitter. Without question, there are features which commend this plan. There are also some obstacles to be met and some very serious objections to it.

The plan is in reality the apprenticeship system,—forcibly restored by the school authorities, but without the contract between master and apprentice—binding the apprentice to complete his apprenticeship, and the master to teach the apprentice the entire trade or craft. This contract placing the direct responsibility upon the master was the greatest virtue of the apprenticeship system.

Before condemning what has been done and altogether abandoning it, let us carefully consider the exercise or "model" scheme. Why was it ever introduced? Has it proven a total failure? Has it not some features which commend it?

Some of us can remember the old sawing, gauging, planing, and chiseling exercises which characterized the early manual training work. Then we had the joints in the making of which, we applied some of the things we had learned in the sawing and planing exercises. The purpose of those exercises was the teaching of the correct use of the tool, the technique of the tool processes. The method of using the tool was perhaps not always the correct one, but that was due to the ignorance of the teacher, rather than to the system.

Then some one complained that such work lacked interest and that the work put upon exercises and joints might be used in making something useful. Then the model courses sprang up. Here, also, correct construction and tool processes were not always insisted upon but this was not the fault of the system.

A carefully selected course of exercises should take the student thru the correct use of all the tools which he should know how to use. In the mind of the teacher, the model is not the desired goal, but his "controlling purpose" is to give the child an experience thru which he will acquire skill and develop reasoning ability. The model is merely a by-product of the lesson.

In doing the chores of the school system, the boys will do those things which need to be done; perhaps one day they will turn down the armature of a motor or assist the mechanic in doing it. The next day they may repair a switchboard or run some wires. There is no planning to the work. Perhaps in a year, there may be one joint for the plumbing class to wipe.

In the school, some one has carefully worked out a series of exercises beginning with simple problems and increasing in difficulty until the boy has had experience in all phases of the work. Some one who understands the work has planned a course which will provide all of the experiences in the trade. In a school, when it is desirable that the boy be taught to wipe a joint, two pieces of lead pipe are provided and the boy is taught to wipe the joint.

No one would think of trying to teach mathematics by starting the pupil in a business establishment as an assistant to the bookkeeper, having the bookkeeper teach him the different processes as it becomes necessary to use them. There are some fundamental operations in mathematics with which a person must become familiar before he attempts to practice them. He must understand addition, multiplication and subtraction, before he can learn to do long division. At least, it is much easier to teach arithmetic in that manner. It is likewise much more economical to teach these processes to a class, rather than to teach them to each individual by himself.

The same is true of Industrial Arts teaching. There are certain operations which can be best taught in a *class* by a *teacher*. After the various operations have been taught and the student has become in a measure adept in their use, then it is well to give him practical experience in their commercial use. The practical shop or commercial experience must be *supplementary* to the shop teaching; it cannot take its place. We need *both* the school shop teacher and the practical mechanic. If we can get the combination, so much the better.

We do not wish to defend the abstract, cut and dried series of models or exercises in manual training. However, we feel that it would be a mistake to abandon *all* class work in the shop; to place the embryo mechanics in the care of men with *no* teaching knowledge, training or experience, and to entirely disregard *all* planning of experiences for them.

One thing should be borne in mind. The so-called skilled artisans are not all that can be desired, even as artisans. In the report on Apprentices of the United Typothetae, the statement is made that teaching by foremen and journeymen will result in men who know only as much as those which we have now, whereas there is a universal need of better mechanics than those we now have.

Another fact should be remembered: No scheme or course of training will put men's heads on boy's shoulders. There is a maturity and a development which comes only thru experience, and it can be supplied in no other way.

VOCATIONAL EDUCATION COMMISSION'S REPORT.

Mr. H. E. Miles of Wisconsin, has made some quite pertinent criticisms of the proposed law for Federal Aid to Vocational Education, recommended by the National Commission.

There is little doubt but that a Federal Board or Commission composed of the Postmaster General, the Secretary of the Interior, the Secretary of Agriculture, and the Secretary of Commerce and Labor would devote very little attention to the matter of Industrial Education. These persons, as Mr. Miles points out, are not appointed to their positions on the President's Cabinet because of their knowledge or sympathy with Vocational Education. Furthermore, their duties on the cabinet prevent their devoting much time or thought to any other matters.

We have had too much tinkering with laws and schools in this country, especially in the matter of Industrial Education, by persons who know almost nothing about it. When we deal with a matter of medical or legal education, we all concede that medical or legally trained men know more than we do about the subject, but everybody is cock sure that he knows all about industrial education, and those of us who have been working and studying along these lines for ten or twelve years have just foolish and impractical notions.

Another clause in the proposed law which is ill-advised is the one which provides that "If any allotment is withheld from any state, the State Board of such State may appeal to the Congress of the United States." We have too much "politics" in our schools now.

What we need is a Board or Commission that will devote some time to an intensive study of the situation; not necessarily a Board of Ph. D.'s in Industrial Education, but men who know what it is to have to do manual labor for a living; men who have experienced the sensations caused by being compelled to hunt for a job.

A Little Argument on Great Principles

"DEAR ME!" sighed Mr. Try Square as he sat at a heavy mission table covered with papers bearing many figures. "This is the penalty of being a manual-training teacher."

"Penalty?" queried Mr. Frills, the care-free art teacher. "I thought you manual-training teachers delighted in close calculations. What is it all about? Life Insurance, Building and Loan, or your Last Testament?"

"Nothing of that sort," replied Try Square. "I was just figuring the number of tenon joints in ten thousand feet of hard pine knots which the president of the board bought from a friend in the business."

Mr. Frills shrugged his shoulders in the significant way of the American art teacher who has just returned from a summer in France, and exclaimed in disgust: "Tenon joints? Pine Knots? For the love of Education, Try Square, when are you manual-training teachers going to cut that stuff out?"

"Yes! Yes! Cut it out!" answered Try Square pensively. "That is just what I have been doing all my life—cutting things out. And mostly against the grain, too.

"But say! Mr. Frills, do you know I still believe there is more real mental and moral discipline in cutting out one good tenon joint than in all of your fine art fancies put together?

"I tell you, Frills, this is a mechanical age and mental discipline is what counts most in education. Now, there is a lot of discipline in a tenon joint. It must be cut to fit perfectly in every part. It serves a useful and structural purpose. It represents mechanical principles and tool processes in the making. It is an essential part of the great—"

"Yes! Yes!" interrupted Mr. Frills. "I quite agree to the mental discipline and also to the usefulness of a tenon joint. I have been all thru that stuff myself. In fact, I can hardly live it down. Old Epecks, our manual-training teacher, used to look those joints over and pull 'em apart with a pop. Yes, it was discipline all right and I never knew how useful they were until one cold morning when the furnace fire went out.

"But, Mr. Try Square, there is one great element of life and education you manual-training teachers forget,—Beauty! Beauty! The world must be taught to appreciate the finer things of life."

"Beauty!" exclaimed Try Square with as much of a smile as he ever indulged. "Beauty is the very word I used today. One of my boys made a perfect joint. It *was* a beauty. Nothing could have been more beautiful."

"Oh! Try Square," wailed Frills with another French shrug. "You are hopeless. How could a joint of wood be beautiful? You might as well call a joint of meat beautiful as a joint of wood."

"And I do, too," answered Try Square with spirit. "A good joint is a very beautiful part of either a machine or animal."

"Part!" echoed Frills. "Ah! Now you have it, Mr. Try Square. A joint is but a *part* of a beautiful whole. Nothing can be beautiful that is not complete. Unity, the first law of beauty, demands that all beautiful objects be complete."

"Is that so? Is that so, Mr. Frills?" answered Try Square, aroused at last to a heat of argument he rarely attained. "Well! If that is so, how about that rose you are wearing in the button-hole of your new fall suit? Is the rose beautiful of itself, or is it just part of a beautiful completeness? Is anything complete in this world? May we not find relations between all things if we follow them far enough, and, as in the old ditty of the leaf and the twig, and the branch and the tree, end helplessly with the green grass growing all around, round, round?"

(To be Continued)

ARTS AND CRAFTS BASKETS.—*Hingham.*

HOW IT WAS DONE!

The purpose of this Department is to present monthly a wide variety of shop projects which have been actually worked out in elementary, high, trade and continuation schools. Contributions are solicited and will be paid for—THE EDITORS.

RUSH SEATING

L. Day Perry, Supervisor Manual Training, Joliet, Ill.

RUSH SEATING is not generally done in manual training shops. This is perhaps due, in the main, to ignorance of the method of weaving. The weaving process in rush work is much simpler and easier than that of caning, but it is limited in its use to some form of seat; whereas caning is subject to a variety of uses as regards constructive and decorative design.

Rush or fiber has been used in our shops for two years, on such pieces of furniture as piano benches, stools and chairs. It has been found a great interest creator, very practical and to be "something different." It is no longer an experiment; it is a fact.

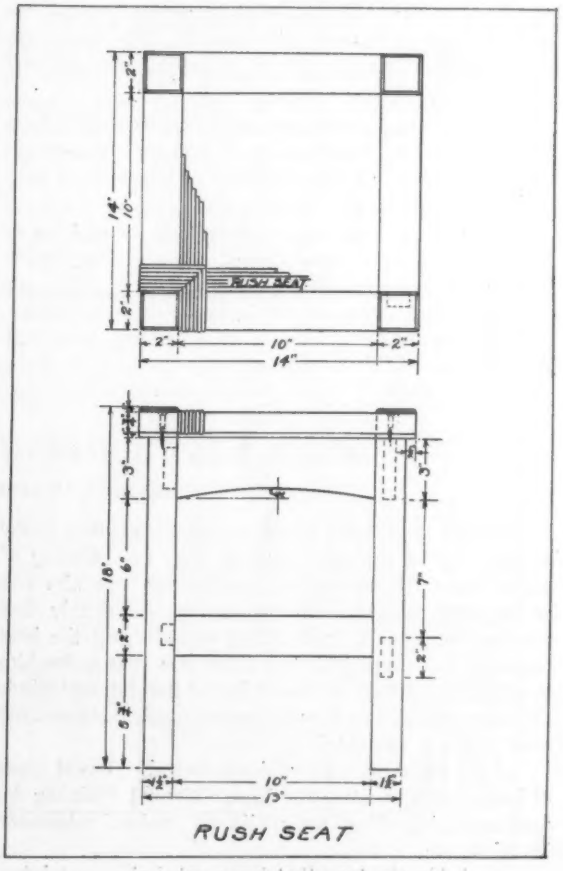
The accompanying photographs and drawings aim to show clearly the method of rush seating; and its application to a typical problem of simple construction, and of good lines and form. The top, which is woven separately from the base, is put on the base by removing the upper caps (which were put on temporarily for the weaving) and fastening to base by means of screws as indicated in the drawing. The caps are then replaced permanently.

It is not necessary to do the weaving over a frame separate from the given article, for even in this problem the upper cross rails may be made narrower, and the posts projected a half inch above. The projected post then serves the same purpose as the cap in the drawing.

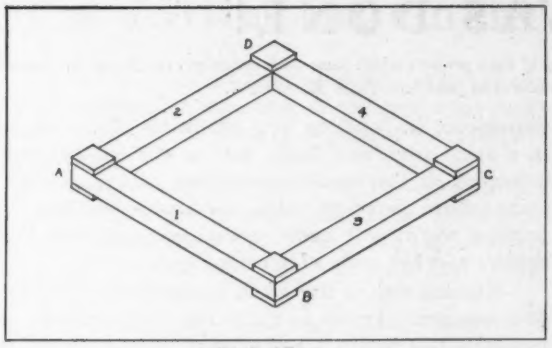
Fiber, for all practical shop purposes, may be obtained in large spools in fine, medium, or coarse and in green or light-brown colors. It costs from ten to fifteen cents a pound. In working with fiber a long strand is desirable, say about ten or fifteen feet. Then for convenience in handling loop two-thirds of the length in a small loop, and fasten with a stiff rubber band, unlooping as the weaving progresses. Fiber is a machine-twisted paper of tough, serviceable quality. To finish a woven seat apply several coats of very thin shellac, and two coats of varnish.

Genuine rush or flag grows in swamps and marshes. It is commonly known as Cat Tails. (It would be an enjoyable task to direct a number of boys in the collection of a sufficient supply for a year's use). The leaves are cut when full grown and still green, and dried in the shade. They are soaked in water when ready for use, and worked while damp. To make a strand twist several leaves together in much the same manner that a shoemaker waxes his thread; with the palm of the hand and the thigh. The thickness of strand depends upon the number of leaves used. To obtain a continuous strand of any length twist in leaves continuously as the strand thins out. The seat may thus be made of one continuous strand, or the end of a strand of reasonable length may be tacked on the bottom of a rail. The same is true of the fiber; the ends may be untwisted and spliced, or they may be overlapped and tacked.

Stool with Rush-Seat. Designed and Made by Student in Joliet Grade School.



Plans for Rush-Seated Stool.



Sketch of Frame.

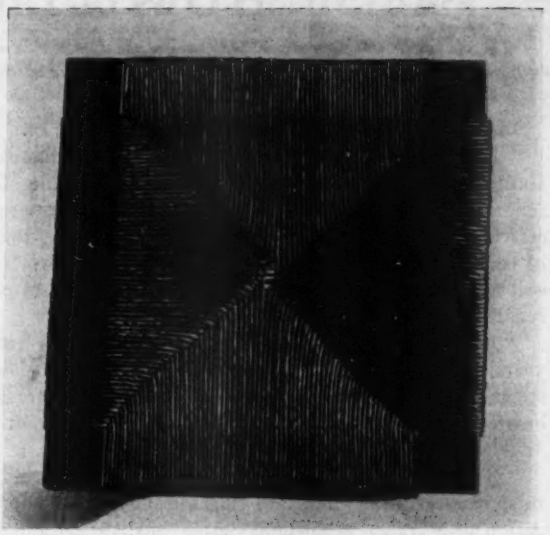
Rush is finished by applying a coat of oil, then two coats of varnish.

The method of rush seating is best explained by reference to a diagram. (See isometric sketch of frame.)

Start arbitrarily at any corner as A. Tack the end of the strand under the rail (1) next to the cap. Pull it out and over edge and top of rail (1) then down at the inner corner and under the second rail (2). Then pull it over the edge and top of rail and directly across the frame opening to the bottom of rail (3) at corner B. Then pull out over the edge and top and down at the inner corner and under rail (1). Pull over the edge and top of rail (1) and directly across frame opening to bottom of rail (4) at corner C. The same process is repeated at all corners in succession until the seat is completed.

Thruout the weaving care must be exercised to keep the strands from overlapping at the corners, and to keep them packed firmly together. It is well to keep uniform tension on the strand.

As the work progresses stuff the interior with paper or cloth. Use considerable force. This stuffing builds up the seat and prevents "breaking down." The rails should be slightly rounded at the outer edges particularly, to prevent the rush or fiber from cutting thru with ultimate use.



Top of Stool.

In making a square seat the initial process is repeated at all corners until all openings are filled, as mentioned heretofore. The end of the strand is then secured under a rail, with a tack. However, in a rectangular frame, not a square, the space on the short rails will fill before that on the long rails. Working around corners is then manifestly impossible. The method is this: go over and under a long rail, across the frame opening, then under and over the other, repeating until completed. This crowds the strands at the crossing in the center. To insure proper crowding tap sharply with a hammer, for they must be compressed just one-half.

The way to proceed in seats of odd shape will suggest itself to the operator if he has become familiar with those of rectangular shapes, for there are no new steps involved. It is merely a question of repetition in filling up the areas.

Note—Fiber may be obtained from The Fiber Grand Co., Grand Rapids, Michigan.

MODEL BOAT BUILDING IN THE SEVENTH GRADE

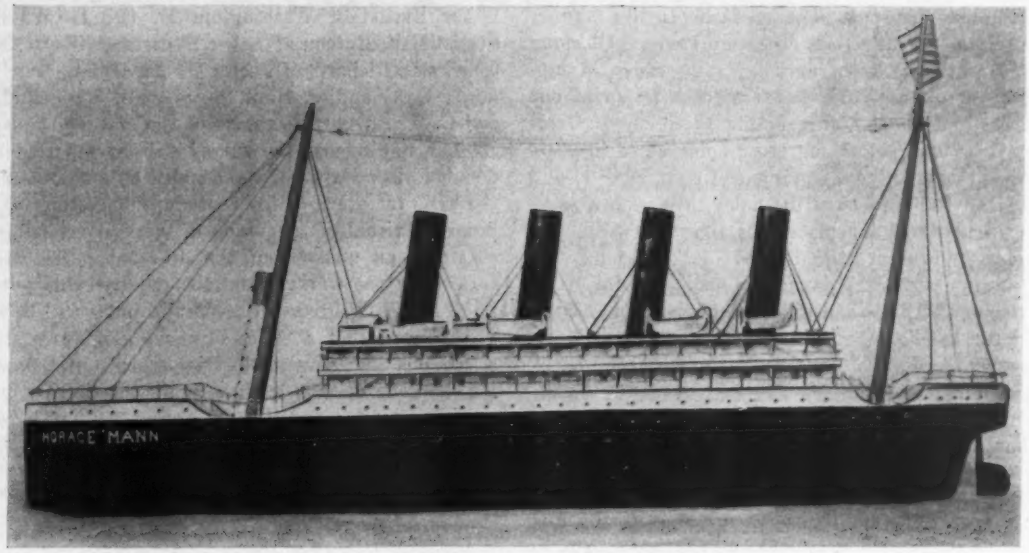
E. A. Funkhouser, Director Manual Arts, Winnetka, Ill.

THERE is probably nothing more fascinating to the average boy in the upper grades than the building of model boats. Especially is this true of boys who live on, or near, navigable streams or lakes. Not only does the boy derive skill in building and shaping the boat properly, but along with this there is a chance for him to gain a great deal of knowledge of the different kinds of water crafts; how they are constructed, their use and how they are navigated.

At the present time we have several different types of boats under construction in our Manual Training department, including ocean liners, yachts, schooners, launches, etc.

Probably the type that has created the most interest and enthusiasm is the ocean liner which is about the most complicated of all the different crafts.

In the accompanying photograph and working drawing I have shown one of these model ocean liners, which never ceases to be "A thing of joy and beauty forever" to the boys who have made it. I do not say that boat building is a problem that all the boys in a class will care to work at, for in any large class, not all the boys will care for boats. However, there will always be some boys who will take up readily with the idea, and their enthusiasm will usually impart itself to others. If the boat is carefully made it is bound to set a higher standard no matter what the succeeding objects constructed may be.

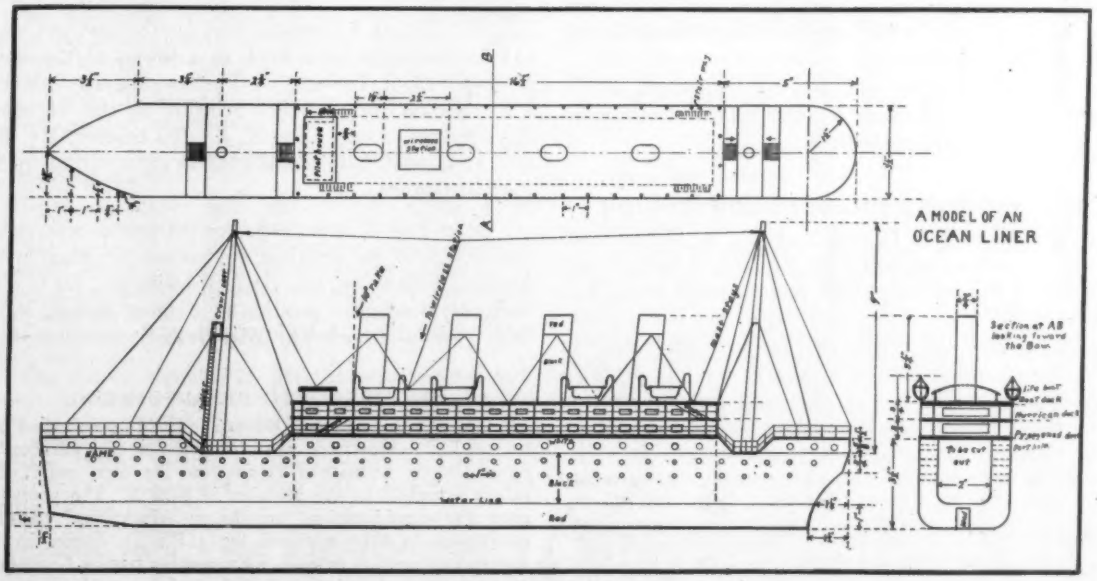


BOAT MADE BY BOY IN HORACE MANN SCHOOL, WINNETKA, ILL.

To make the model boat successfully does not require a great amount of skill; only careful, painstaking work and careful following of the plan and explanations. The boat was modeled after the "Olympic" and as many of the details of the huge, floating palace were put into the little model as possible. In order that the model boat shall appear well, it is very essential that it have the right proportions, as to length, width and height. The ratio here used is, the width is to the length as one is to nine; and the height from keel to top of smoke-stack is nearly twice the width.

For the hull select a clear piece of white pine 4"x4" and dress down until its width is 3½". This will require a length of 31". Shape the hull properly by first laying off the curved lines shown in the drawing, and then cut to the liner and smooth. The hull is hollowed out in order that the boat may rest higher in the water.

It is a good idea to place two or three pounds of lead in the center of the Keel if the boat is to be kept in water in order to reduce the danger of being top-heavy. After the hull has been shaped, the port holes should be laid off and bored with a gimlet bit. Very thin lumber is used for the deck (⅛" bass is very good). The hull should be covered with a layer of this thin lumber. Next the cabin of the Promenade deck is cut to proper size from white pine stock. It is best to cut



PLANS FOR OCEAN LINER.

holes about 3/8" square along the sides and ends, to represent windows, before it is nailed fast. In like manner the Hurricane and the Boat decks are made. All along the edge of the deck there is a railing which is supported by a row of No. 6 finish wire nails placed one inch apart and about 1/8" from the outer edge. Great care must be used in making these holes, since they are so close to the edge there is danger of splitting. It will be found advisable to burn the holes thru with a small wire. On many of the places (as shown in plan) the davits enter down thru the different decks and take the place of the nails. The davits are made of wire of the same size as the nails and are bent to the proper angle to hold the life boats, allowing them to swing out over the edge of the deck.

The mast and funnels are next made to dimensions, of pine. They are not placed perpendicular to the deck but the tops lean toward the stern at an angle of 10°. This is called the rake; great care must be exercised that they all slope the same, and it will be best to cut the funnels in a miter box. The masts are fastened to the hull by being inserted into holes bored to fit. The holes must be bored at the proper angle and this is best done by holding one of the funnels that has the proper pitch along side the bit while boring the hole.

The wireless fixture, Pilot house, life-boats, crow's nest, etc., which are shown sufficiently on the drawing to need no explanation, are next made and put in place. A railing of copper wire is placed entirely around the boat on the promenade deck, also around the other decks.

The boat is now ready for painting, which if done right, gives it a very artistic appearance. The boat may be placed in a tub of water and the water line marked. It should be painted red up to the line. The main part of the hull up to the Saloon deck is painted black. All the upper decks are painted white. The funnels are painted black up to within 1/2" of their tops; the rest is red. The masts are yellow. Two coats of the red and black paint will be sufficient, but the white and yellow will need more.

This model is not equipped for locomotion, but it could be built similarly on a larger scale and connected to an engine or storage batteries.

THE NATIONAL SOCIETY'S CONVENTION.

December 9, 10, 11 and 12, 1914, are the dates set by the Executive Committee for the Eighth Annual Convention of the Society, which this year will be held in Richmond, Va.

Since May 1st, the Society has been conducting an educational and industrial survey in the city of Richmond, for the purpose of obtaining full information concerning the principal industries in order to formulate plans for improving the opportunities for vocational training in that city. This survey has been carried on under the direction of a committee of the National Society consisting of the following: Dr. Leonard P. Ayres, Russell Sage Foundation, New York; Chas. H. Verrill, Bureau of Labor Statistics, Washington, D. C., Charles H. Winslow, Special Agent Bureau of Labor Statistics, Washington, D. C.; L. W. Hatch, Statistician, Bureau of Labor Statistics, Albany, N. Y.; Charles R. Richards, Director Cooper Union, New York; J. A. C. Chandler, Supt. of Schools, Richmond, Va., and C. A. Prosser, Secretary of the National Society.

The findings of the survey will be reported to the members in advance of the convention and will serve as the basis for much of the procedure of the meeting. In order to visualize the kinds of work done and results obtained, an analysis of the different operations performed by the workers and the requirements put upon them for their successful accomplishment will be shown. It is hoped that a series of moving pictures showing operations in typical industrial schools in the country will be done in time to show at the meeting.

In addition to many strong speakers there will be several conferences on important phases of the industrial education movement, such as:

The problem of state legislation.
Recognition of industrial education in trade agreements.
Industrial and general part-time schools.
Evening industrial schools.
Trade preparatory schools.

MR. FRED L. GRIFFIN, who for the past two years has been an instructor in woodworking at the State Normal School, Oswego, N. Y., has resigned to accept a position as shop superintendent at the Kamehameha School, Honolulu, H. I. This is a position that pays a very high salary as it carries with it much responsibility. Mr. Griffin has had extended experience and training for the new work and we congratulate him and wish him much success in his work in Honolulu. Mr. James M. Early has been elected as Mr. Griffin's successor. Mr. Early received his training at Berea College and the University of Illinois.

MR. RALPH A. LOOMIS, who for the past two years has had charge of the work in printing at the State Normal School, Oswego, N. Y., has resigned to accept a position as instructor of printing in the Technical High School, Jersey City, N. J. His brother, Mr. Edwin F. Loomis, has been elected to succeed him in the work at Oswego.

MISS IDA M. PARR, who for the past two years has had charge of the drawing and manual training in the Kendall School for the Deaf, Washington, D. C., has resigned to accept a position at Pelham Manor, N. Y. Miss Parr is succeeded by Miss Ruth E. Stone.

SPECIALIST TO BE APPOINTED.

The United States Bureau of Education has announced a competitive examination for the position of Specialist in Industrial Education, for men only. The salary attached to the position is $3,500. The prerequisites for consideration include an educational training equivalent to that required for a Ph. D. degree in Industrial Education or Social Economics from a University of recognized standing, and at least five years' experience.

BOOK REVIEWS

Primary Handwork.

Ella Victoria Dobbs. 124 pages. Price, 75 cents. The Macmillan Co., New York.

It is refreshing to read such a book as this little volume by Miss Dobbs, of the University of Missouri. There has not appeared a more interesting, sane, and helpful book on handwork for the elementary grades.

Every page bespeaks the author's intimate knowledge of child life and the spirit of modern psychology.

The problems, instead of being abstract projects with but little meaning and value, are pulsing with the very life and interests of the children's environment.

There are ten chapters bearing such headings as, Booklets, The House Problem, The Village Street, Sand Tables and What to do With Them, Animals and Toys.

Every primary teacher, and every teacher and supervisor of handwork in the lower grades, should have a copy of this book.

Masonry.

George R. Barham. 184 pages. Price, 20 cents, net. Longsman, Green & Company, New York, Bombay, Calcutta.

One of the excellent handicraft texts published by Longmans, Green and Company. This book is explicit and clearly illustrated. It contains chapters on "tools and machinery for stone working;" "The conversion of stone from the quarry rock to the finished building forms;" "drawing and laying out of stone work;" "construction;" "erection and setting;" The selection of materials for masonry; "stereotomy" or the art of cutting solids into the geometrical forms necessary for building.

Elementary Exercises in Agriculture.

By S. H. Dadisman. 106 pages. Price, 50 cents. The Macmillan Co., New York.

As its name implies, this is a series of lessons specifically outlined dealing with fundamental agricultural matter.

Quoting from the preface.

"The book aims to tell of the things that the child should know in order to become interested in the farm life."

The great amount of valuable information in this little book seems to be reduced to its lowest terms and *very clearly* and definitely put before the teacher or pupil.

Mr. Dadisman, the author, is the man who as Principal of the Rollo, Illinois, Consolidated School, has given direction and character to that interesting school.

He has been remarkably successful in this agricultural work, and this little volume puts into usable form his own experiments and experiences.

The Thinking Hand, or Practical Education in the Elementary School.

By J. G. Legge. 217 pages. 7"x10", cloth. Price, $2.25. The Macmillan Company, New York, N. Y.

This book is a complete description of the educational handwork which is given in the elementary schools of the city of Liverpool. It describes the work, the reasons for doing that particular kind of work, and shows the close relationship existing between this work and all of the other school activities.

The first six chapters are devoted to an exposition of present day school conditions, the misfits, the prevalent waste of time in the schools, the large mortality, etc., and points out the direction in which the schools must progress. Being written by the Director of Education of Liverpool, what he says carries with it the weight and prestige of his position.

The author does not offer any panacea for all the ills of education, but in a clear, sane, logical manner, he shows how the schools must be, and are being modified to meet present day conditions. Complete schemes for all the handwork courses in the elementary school are presented together with photographs of work done by the children in the Liverpool schools.

It is exceptionally well written, is very suggestive, and will prove a valuable acquisition to the library of every educator.

The Philippine Craftsman.

A magazine published at Manila by the Bureau of Education; devoted to the advancement of Industrial Instruction in the public schools of the Philippines.

Productive Horse Husbandry.

By Carl W. Gay. Edited by Kary C. Davis. 331 pages. J. B. Lippincott Company, Philadelphia and London.

One of "Lippincott's Farm Manuals" which are intended not only for the agricultural student, but for the expert, and as a reference for the busy farmer. It has been the author's purpose to emphasize *industry* as applied to the production, marketing, and use of horses.

The work is quite complete in every detail. The text is fully illustrated with 173 illustrations. Each breed of horse is discussed showing the distinguishing characteristics and showing why the particular breed is so well adapted to the purpose for which it is noted. Score cards for the different breeds are given, plans for stables, faults in vehicles, harness and saddles. One chapter is devoted to the mule.

Productive Swine Husbandry.

By George E. Day. Edited by Kary C. Davis. 330 pages. J. B. Lippincott Company, Philadelphia and London.

This is another of Lippincott's Farm Manuals and takes up the subject of swine husbandry in the same exhaustive manner as the other books in the series. It discusses the advantages and disadvantages of the different breeds, the kinds of feed calculated to produce the best results, the diseases of swine, etc.

A very valuable book to every person interested in raising swine. It should be in the library of every country school.

The Progressive Element in Education.

By Arthur D. Dean. Commencement address at Alfred University, June, 1913. Printed by the boys of the printing department of Vocational School, No. 11, Buffalo, N. Y.

Present Status of Drawing and Art in the Elementary and Secondary Schools.

By Royal B. Farnum, Albany, N. Y. Bulletin 586, United States Bureau of Education, Washington, D. C.

A thoro discussion of the historical development, the aims and scope of art teaching, organization and methods, outlines of courses of study and of drawing in the elementary and secondary schools. The pamphlet, also, contains discussions of the application and correlation of art study in schoolroom decoration, materials and equipment, art clubs and associations, lists of schools, etc.

Collections and Preservation of Insects and Other Material for Use in the Study of Agriculture.

By C. H. Lane and Nathan Banks. Bulletin 606, Department of Agriculture, office of Experiment Stations.

This bulletin is intended for the use of teachers in rural schools and contains suggestions about the kind of material which should be included in school museums.

BRIEF ITEMS OF INTEREST

A LETTER IN DEFENSE OF MASSACHUSETTS.

To the Editors:

The Comment made by the editors in the *August* number which followed my letter on the subject of restricted evening school attendance may tend to create a wrong impression of both letter and comment unless a little more is said. The impression given that the writer must necessarily know nothing about conditions which occur outside a restricted school, was not based on facts, but was a purely gratuitous assumption which the editors would not have made if they had known. As a matter of fact this is a rather small city as cities go, and my acquaintance is much larger in manufacturing circles than in school circles. More than that, this provision of the law is not well known, and it does not in any way deter men from applying for admission to the school, no matter where they may be working. As I said, the number of men on whom this has worked hardship is negligible. It is not as many as have had to be turned away for lack of room.

The crucial point that possibly I did not bring out strongly enough is that if any material progress is to come from a winter's training in evening school, the training must be along such lines that the principles learned can be applied in daily life. There are few of us who get any great good from purely abstract reading or study. We have to have something to which to hang it thru other senses in order to make it stick. If this is true of us it is much more true of the class of men who do attend evening schools. The man in the box shop had already a background of experience such that he could profit by the theoretical training that we gave him. The other box makers who had no chance to handle wires, lights, and motors at all did not have it. There would be an open question here as to the chap whose avocation was along electrical lines. He might be able to profit by an evening course, but in most cases that I have observed such men play at their avocation in such a way that they do not care to stay in a course that is laid out as a business-like proposition.

Is there anything about snagging castings that will assist a man in learning to operate a drill press? Yes, there is. He is in a machine shop atmosphere where he is seeing machine work done all the time and he is where he can get promotion as soon as he shows that degree of mechanical interest in the work that entitles him to a chance. I have spent most of my life in a machine shop, not a school shop either, and I know how eagerly laborers who can be trusted to handle a machine are snapped up. Few employers would give a man a chance who came to them and said that his experience had been in a freight house.

There is one thing that should be borne in mind and that is that there is no way in which an employer can influence the school as to whether it shall admit a pupil or not. The fact that a man is a carpenter and is over 17 years of age entitles him to a place, if there is room, in a class for carpenters. He may be out of a job at the time. He might be working as a bartender during the slack season, but that would not make him any the less a carpenter. He would be studying the principles which he had, unwittingly perhaps, been applying all thru his past experience, and which he would apply later.

Another thing; this restriction applies only to state aid. State aid is only given to the lines of educational work that appear to be in serious need of encouragement. This particular line seems to be in sad need of encouragement, owing to its neglect by the old-line schools. Any school that sees fit to forego a portion of its state reimbursement is at perfect liberty to admit pupils whom they think can profit by any part of the work that is offered. This thing was done in the case of domestic arts work for girls who were not employed in that industry so much that here in Massachusetts that work has also been state aided. There has as yet appeared no similar demand in the case of men. If there ever is it will doubtless be met.

My statement that the manufacturers of Massachusetts are not interested in industrial education is, of course, one which might be challenged by some one who knew another set of men. I can only judge by an experience running back over ten years' time during which I have been working on this subject. I can say truthfully, that outside the people who are drawing salaries for interesting themselves in this subject, that there are not more than a dozen manufacturers who would put themselves to any degree of inconvenience on account of their interest. I doubt very much if there are a half dozen employers of labor that know that attendance at night school is restricted. It is true that there is an Association of Corporation Schools, but it is also true that it has only four members in Masachusetts, and that none of the four are represented by members of the firm. There are a few enthusiasts, but when you have named Monroe and Filene of Boston, Alexander, of Lynn, and Alden of Worcester, you have nearly exhausted the list.

Massachusetts is going to give state aid to evening schools for the training of teachers for industrial schools. Now we get teachers who have had no experience. We are getting along with them. We have gotten along for years with high-school teachers who have had no training in teaching except what they got on the job. Only five per cent of our high school teachers have had any training in pedagogy, and still we have high schools, and we would have trade schools if the state did nothing to train teachers. The state does not expect to make a complete teacher in a winter, but it does hope to alleviate the condition by at least weeding out the hopelessly inefficient before they get on a payroll.

E. H. Fish.

GIRLS' TRADE SCHOOL EXTENDED.

The Trade School for Girls at Boston, Mass., opened for the fall term with accommodations for additional students. A branch school has been opened in the North End of the city, and a machine operating room in the down town section will provide practice work during the dull season. The new addition has been occupied for some time and provides accommodations for more than one hundred pupils at a time, or five hundred in all. The newest feature of the equipment is an electric kitchen including a fireless cooker.

To provide accommodations for the large number of applicants, it has been decided that a preparatory class be established in each school district of the city for those who desire to test their fitness for a trade or industrial school. These classes will serve as laboratories for vocational guidance, pupils showing ability in any special type of work entering the special school with advanced standing to complete their training and enter upon a business position.

The school has been obliged to meet with refusal more than fifty requests for admittance. Altho the cutting and fitting department has been in operation only since the first of the present year, the first student to complete the course finished in three months' time and began work at $9 per week. A number of girls began at $7 but the average is still near $6 for those who have only meager training.

DISCONTINUE SHOP CENTERS.

Milwaukee, Wis. The school board has determined to extend Manual Training shop facilities to all grammar-school buildings in the city, and to discontinue its

policy of maintaining shop centers in the larger buildings only. It has been found that while the shop-center idea is economical in equipment and reduces the number of instructors, it wastes the time of children in the long trips to and from the centers.

It will not be possible to equip all grammar schools, but every building which has available space for a shop will be immediately fitted with benches, tools and a teacher.

The school board has, also, determined that all classes above the fourth grade, shall receive Manual Training instruction,—the boys to do shop work in wood and the girls to do sewing under the regular teacher. The programs will be so arranged that the classes receive an hour and thirty minutes per week.

Teachers of shop work will give six full hours of teaching each day in addition to all the time necessary to care for the equipment of the shop. Extra classes taught on Saturdays by them will be paid for at the rate of $1.00 for each period of one hour and thirty minutes.

MR. GEORGE TO ST. LOUIS.

Mr. L. W. George who has been recently head of the Drawing Department of the Milwaukee Continuation School, has become Director of the Shop School of the Commonwealth Steel Company of St. Louis. Mr. George is a schoolman of long experience and is particularly well fitted by training and experience for managing a corporation school. He has been engaged at various times as teacher and principal of elementary and high schools, and has been Supervisor of Drawing at Nashville, Tenn., St. Joseph, Mo., Austin, Texas, and Montgomery, Ala.

In his new situation, Mr. George will not only act as principal of the trade school, but also as general welfare director of the Comonwealth Steel Works. The firm has determined to make its Trade School strictly educational in character, and the cultural studies will be emphasized. Its welfare work has been well known for many years. The company maintains at its Granite City plant a splendid recreation building for its employees in which are located a model cafeteria, game and recreation rooms, shower baths, etc.

WM. T. BAWDEN APPOINTED.

Mr. Wm. T. Bawden has been appointed temporarily as Specialist in Industrial Education for the United States Bureau of Education.

Mr. Bawden is a native of Ohio and received his earlier professional training at Denison University and Mechanics Institute, Rochester. He has taught successively in the elementary schools of Ohio, in the Elmira, N. Y., State Reformatory and in the public schools of Buffalo. In 1902 he spent a year at Teachers College where he received a bachelor's degree in manual training and the degree of bachelor of science. From 1903 to 1910 he was head of the Manual Training Department of the Illinois State Normal School, Normal, Ill., and from 1910 to 1912, assistant dean of the College of Engineering, of the University of Illinois. In June, of the present year, he received the degree of doctor of philosophy, from Columbia University, for special work in Industrial Education, the subject of his doctor's dissertation being "a study of occupations in the cloak, suit and skirt industry."

Mr. Bawden has held important offices in the Illinois Manual Arts Association, Western Drawing Association and other teachers' organizations. He has been particularly active in school surveys in the field of vocational education and is still a member of the organization which is making the Richmond industrial survey.

DR. WM. T. BAWDEN,
Specialist in Industrial Education, U. S. Bureau of Education, Washington, D. C.

MR. L. W. GEORGE,
Director, Shop School, Commonwealth Steel Co., St. Louis, Mo.

A Recent report of the continuation, industrial and evening schools of Milwaukee for the year 1914 has just been issued by the Wisconsin State Department of Education. The report gives the total attendance in continuation schools as 6,914, in industrial schools, 727, and in evening schools, 5,535. The day continuation schools had an attendance of 3,753 while the industrial school for day apprentices registered 427 students.

In the evening schools, the attendance was distributed among the following: 386 clerks, 722 mechanics, 62 dressmakers, 42 tradesmen, 179 telephone operators, 16 teachers, 84 draughtsmen, 40 printers, 420 waiters and servants, 249 housewives, 496 factory workers and 2,492 miscellaneous workmen.

The total expense of the apprenticeship school was $9,835, of the continuation school $66,183, of the all-day industrial school $3,400 and of the evening schools $28,252. The total assessed valuation of city property is $486,424 for the next year while the maximum tax levy is estimated at $243,212. The tax levy for the last year was $130,000 and the disbursements were $118,771.

Aberdeen, S. D. Courses in cement work and printing have been introduced in the Manual Training Department. For the former, two 90-minute periods of instruction are provided. The printing class will be given all the necessary printing for the schools.

GENERAL NEWS NOTES

GRAND FORKS, N. D. A course in Household Arts, embracing book and laboratory work, has been introduced in the schools.

BUFFALO, N. Y. A domestic Science Department has been established in connection with the Farm Bureau of the local Chamber of Commerce. Miss Katherine H. Mills, of Cornell College, is in charge. Miss Mills will begin her work by visiting farms in the vicinity of Buffalo, becoming acquainted with the farmers' wives and organizing traveling classes for the teaching of home economy, sanitation and baking.

BILOXI, MISS. The art course has been discontinued in the public schools and one in Domestic Science substituted.

PITTSBURGH, PA. The Carnegie Institute of Technology will shortly broaden the scope of its work with the completion of the new addition, the Margaret Morrison School. The addition will provide more classrooms and additional laboratories. It will also give greater scope to the work of dietetics in the way of research and experimental work. A laboratory is provided where the expert may watch the effect of certain foods on students who go to him for observation.

FRUIT canning lessons were recently given in the county department of the Chicago City Hall for the county country life leaders. A delegation of teachers was instructed in the mechanics of sealing cans by means of a demonstration plant installed in the office of the county superintendent.

CHICAGO, ILL. A girls' technical high school has been opened in the new Harrison Technical High School building of Chicago for students on the west, north and south sides. In organization and methods, the school resembles the Lucy S. Flower High School.

NORTH ABINGTON, MASS. Domestic Science, to a limited extent, has been introduced in the Adams and Dunbar schools for the next school year. Classes are in charge of regular teachers in the respective schools.

WAUWATOSA, WIS. Miss Mary Pease, Wauwatosa, has been appointed instructor in Domestic Science at the Milwaukee County Agricultural School and Mr. Walter H. Perry, of Massachusetts, instructor in Agricultural Economics.

OAKLAND, CAL. Vocational instruction has been introduced at the Piedmont Avenue School following the reorganization of classes for departmental work in the sixth, seventh and eighth grades. Pupils are permitted to elect such subjects as music, drawing, manual training, copper work, cooking or sewing.

JACKSONVILLE, FLA. A Trade School for Girls for the teaching of dressmaking, millinery and making of white goods has been opened. The aim of the school is to fit the girls for work in the factories at the highest wage possible for beginners. There is a steady demand for skilled labor in the dress industries and manufacturers will pay as high as $7 to $8 per week for trained girls. Those who learn the trade in the factories can earn only $3 as beginners.

A PRINTING DEPARTMENT has been installed in the high school at Davenport, Ia., at an approximate cost of $700. The equipment includes type, a small printing press and other necessary things. For the present, only students of the high school will be enrolled in the printing classes. Students who take the work will set up programs used at the school entertainments, and may even do the typesetting and printing of school publications. It is believed the printing department can be made to pay for the cost of the equipment and instruction and in time become self-supporting.

VOCATIONAL work at the Central High School, Kansas City, Mo., has been enlarged thru the addition of a foundry, a paint shop and a machine shop. Courses in these lines and in plumbing have been made a part of the curriculum. A total of $15,000 has been spent for the foundry building and equipment.

DETROIT, MICH. The students of the Manual Training Department of the Eastern High School recently sold for $75 a garage built by the class. The proceeds will be divided among the students or devoted to a fund for the purchase of additional equipment.

BENTON HARBOR, MICH. A building devoted exclusively to the departments of Manual Training and Domestic Science is to be added to the equipment of the public schools during the next year. The building will be two stories in height and constructed of brick with floors of asphalt over concrete. The first floor will be used by the Mainual Training Department and the second by the Domestic Science Department. The interior finish will be undertaken by the students of the former department under the direction of the supervisor. The building will cost $8,500.

THE MINNESOTA STATE HIGH SCHOOL BOARD has authorized the distribution of $1,093,383 as state aid to high, grade and rural schools for the ensuing school year. Of this amount, $90,253 is given to high schools teaching Agriculture, Manual Training and Home Economics. To high schools maintaining industrial courses in Agriculture the sum of $147,000 is given. Thirty-two schools in the grade-school list receive an additional total of $32,787 on account of Agricultural, Home Economics, Manual Training or Industrial courses.

SUPT. D. S. PENCE of Sedgwick County, Kans., has just put into operation a plan for teaching Manual Training, Domestic Science and Music in the country schools. Three supervisors have been employed to cover the county twice every three weeks. They will make their headquarters at Wichita and will drive from school to school in motor cars supervising and assisting the regular teachers.

SAN ANTONIO, TEX. The annual report of Supt. Charles Lukin shows that Domestic Science and Manual Training have been popular with the pupils of the public schools during the past year. The Domestic Science classes were attended by 1,995 students and the Manual Training classes by 1,539 students. The value of Domestic Science and Manual Training apparatus is given at $16,000.

THE LOUISIANA STATE BOARD OF EDUCATION has granted to graduates of Domestic Science Departments of Louisianna Industrial Institute at Ruston and Southwestern Institute at Lafayette, the right to teach the subject in the public schools without examination. A committee composed of Supt. Harris, C. J. Brown and Mr. Butler has been appointed by the Governor to pass upon applications for approval for high schools, agricultural and domestic science schools.

CHICAGO, ILL. Under a new arrangement, girls of the city high schools will be offered practical marketing, cooking and serving of food in connection with the Domestic Science work. The lunch rooms which have previously been managed by concessions have, to a large extent, been turned over to the culinary departments of the schools. The change will give opportunity for the teaching of cooking on a large scale making the instruction far more useful to the girl students. Miss Elizabeth Murphy is in charge of the establishment of school-operated lunch rooms.

FREEWATER, ORE. A Manual Training building has been erected for the department. The interior work, construction of chairs and work tables, and other furniture was done by the boys.

CHEHALIS, WASH. The school board has ruled that pupils in the Manual Training, Commercial and Domestic Science Departments must pay for the supplies and materials used by them in classes. The order will result in a considerable saving to the district and yet will not work a hardship on the students.

WINSTON, N. C. A Domestic Science course has been introduced in the public schools. The subject may be elected in place of geometry in cases where the students do not expect to enter college. Students who expect to enter college, where solid geometry is not an entrance requirement, are also permitted to take the subject.

GRAND RAPIDS, WIS. A continuation school has been opened under the direction of Mr. E. L. Hayward. The school has four separate departments as follows: Industrial, Commercial, Continuation and Evening.

CHARLOTTE, N. C. A Manual Training Department has been opened in a separate building for the boys of the public schools. The subject will be required of all students in the eighth, ninth and tenth grades for the present year and for the second year will be elective for students in the third year of high school. The course includes elementary bench work, the operation of machinery, repairing, construction, and makeup of parts of machines. For the present year all the students will be taught to master the handling of tools, beginning with the simple and working up to the more complex. After the use of hand tools has been mastered the manipulation of the machines will be undertaken. The pupils will be taught wood-turning and patternmaking at a later date. Emphasis is to be laid on the proper care of tools and neatness in the design and construction of furniture. The students will be expected to make their own models. Mr. Charles E. Lacy is in charge of the department.

SPRINGFIELD, ILL. In connection with the operation of the junior high schools, it has been determined to give the Feitshans School a vocational trend. Manual Training, Domestic Science and allied subjects have been included in the course of study.

KINGSVILLE, TEX. Departments of Manual Training, Domestic Science and Agriculture have been added in the high school.

ABERDEEN, S. D. A Printing Department has been added in the high school under the direction of Mr. K. H. Patrick, formerly of Rhinelander, Wis. The Department is the first to be introduced in public schools in South Dakota.

MINNEAPOLIS, MINN. The school board has unanimously voted to establish a vocational high school. The action is in accordance with the terms of the will of the late Wm. H. Dunwoody who bequeathed a sum of money for this purpose.

OREGON CITY, ORE. A one-year course in Agriculture has been added in the high school. For the fourth year, a course in household chemistry has been provided.

THE INTERNATIONAL STEWARDS' ASSOCIATION, at its annual meeting held at Boston, took action toward the erection of an institution for the training of hotel employes at Muncie, Ind. The building will cost about $500,000.

ALAMEDA, CAL. Two new courses have been added at the high school under the titles of mechanic arts and domestic chemistry. Mr. J. E. Carpenter is in charge of the former and Mr. Willis Minium of the latter.

SAC CITY, IA. A Manual Training Department has been opened offering instruction to students of the high school and of the seventh and eighth grades. Mr. George E. Wallace is in charge.

RIALTO, CAL. A Manual Arts Building has recently been completed for the city schools. The building is one story in height and is divided into three parts, a manual arts room, a domestic science room and a sewing room. The building cost $3,600; an additional $1,200 was spent for equipment.

FORT WAYNE, IND. Mr. H. C. Porter, of Springfield, Ill., has been employed as instructor at the Vocational School.

MISS ALBERTA GREEN, Lewiston, Mont., has been appointed instructor in Art at the Oregon State Normal School, succeeding Miss Alabama Brenton, who has been granted a leave of absence to make a special study of the subject.

MR. CLIFFORD STEVENSON has been appointed instructor in Manual Training at the Southeastern Alabama Agricultural College at Abbeville.

LOWELL, MASS. Mr. Herbert Carrigan has been appointed instructor in the Manual Training School.

A RECENT report of Mr. R. O. Bagbey, head of the Manual Training Department at South Omaha, Neb., shows the average cost, per student, in this subject, to be 44 cents. This is very small when the amount of materials used is taken into consideration.

A WEEKLY seminar in "Vocational Guidance" is being held at Oakland, Cal., under the direction of Mr. Charles L. Jacobs, instructor in "life career studies" of the San Jose high school. The members of the class are teachers in the Oakland schools.

Vocational guidance is the general subject for informal discussion, to be continued during the present fall and coming winter, and a large part of the class has taken specific phases of the subject for special investigation. The discussions in the class center around the actual work of the students in the schools. Teachers who take the work will receive credit in the University of California and may, also, apply for advanced standing in the Oakland salary schedule.

ART-CRAFT BASKETS—*Hingham.*

NOW, ARE THERE ANY QUESTIONS?

Readers are urged to ask questions concerning the Industrial Arts. The editors will reply to those questions which they feel that they can answer, and to other questions, they will obtain replies from persons who can answer them authoritatively. Questions should be addressed to THE EDITORS.

Oxidizing Silver.

Q:—I have been using liver of sulphur for oxide on silver, and I find that it must be fresh to get the best results. Is there some other oxide one can use?—J. C. B.

A:—The following mixture will last indefinitely: 4 ounces vinegar, ½ ounce sal-ammoniac, ½ ounce sulphate of copper in solution. The silver articles are dipped until black, or the solution may be put on with a brush.

Welding Heat of Iron.

Q:—I have had difficulty in telling with certainty when iron has reached the proper heat for welding. Is there any advice that will help me to get this heat?—K. R.

A:—There is no certainty of getting the right heat for welding except judgment of color which one gets from experience. The amateur can judge welding heat best by heating the iron until it is as light in color as the lightest part of a well burned fire. This color is a light lemon color or nearly white heat.

Anvil Tool Handles.

Chicago, Ill. Q:—Under the list of "Some Things to Remember in Doing Forge Work" by Thomas Googerty, published in the May number of your Magazine, the statement is made that the handles of anvil tools should never be wedged on and should project thru the eye one inch or more. Why should the handle of an anvil tool project thru the eye, and why should it not be wedged as other handles are wedged?

A:—Handles of anvil tools should project thru the eye for the following reasons: When using an anvil tool on hot iron it becomes hot and the handle is liable to loosen. When the handle is left projecting thru the eye, the tool can be seen as it moves toward the end of the handle and can be driven back by striking the end of the handle on the anvil. The best handle for anvil tools is a good grade buggy spoke which is long enough to allow the one holding the tool to keep his hands well away from the heat. The spoke should be made to fit tight but should not be wedged for the following reasons: If the handle is wedged, the tool cannot be seen as it slips off the handle; moreover, a wedged handle has no play, and being rigid, it is more liable to be broken by a glancing blow with the sledge than one that is not wedged.

Manual Training Schools in Chicago.

Havelock, Neb. Q:—Can you recommend some manual training schools in Chicago.—Mrs. C. H. Wheeler.

A:—Your question does not specify what kind of manual training schools are of interest to you. Practically all of the elementary schools in Chicago offer good courses in manual training. There is very little difference in the character or merit of the work, so that any school which you may visit, will give you an idea of the work.

If you want to economize in time, it might be well if you would visit one of the three high schools offering pre-vocational manual training for boys and girls over fourteen, who are enrolled in the sixth, seventh and eighth grades. The Lane, the Crane or the Lake high schools will illustrate this work very nicely. For girls, the Lucy Flower High School will serve.

An independent school offering elementary manual training is the Francis W. Parker School, connected with the School of Education of the University of Chicago. The school offers a very complete course, but charges tuition.

For secondary schools, the Lane Technical High School, the Crane Technical High School, the Lake High School and the Harrison Technical High School may be suggested. All offer manual training courses of the highest character. If you are interested in girls' work, the Lucy Flower High School should be visited.

Another good secondary school, offering manual training, is the University High School, a private institution.

The Chicago Normal College, Armour Technical Institute, Lewis Institute and the School of Education, University of Chicago, offer courses in manual training for teachers of the subject. They are of college grade and courses finished in them count toward a college degree.

Steel Stamps.

Q:—How are steel stamps, with which to mark metal work, made?—*A Subscriber.*

A:—Steel stamps, with which metal may be marked, are made by cutting the design on the end of a piece of steel to be used as a punch. The resulting impression is either raised or sunken in the metal. In making a sunken mark like the drawing Fig. 1 the lines on the end of the stamp are raised. A piece of annealed tool steel a third larger than the mark is used. The end is filed square, the piece heated enough to blue it and cooled. It is then held in a vise and the design scratched with a pair of dividers and scratch awl. This

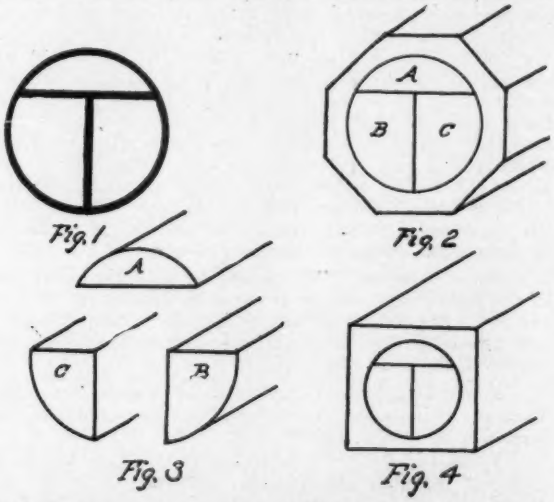


Fig. 1 Fig. 2 Fig. 3 Fig. 4

divides the area into three parts which are shown at A, B and C, Fig. 2. These parts are then countered, or sunken with punches of that shape. Punches made to fit the parts shown at A, B and C. These punches are filed with a 60° angle around the outside as shown in Fig. 3. They should then be hardened and tempered to a straw color. These punches are then used to force the metal down on the stamp leaving the lines sharp and in relief. The outside of the lines in the stamp are then filed on an angle of 60°. If the lines are not sharp they should be dressed with a sharp graver. The stamp is then hardened in brine to a straw color. If the lines of the mark are to be raised instead of sunken, the lines that were scratched on the end of the steel are sunken with a chasing tool and the outside of the stamp filed square as shown in Fig. 4. This stamp makes a square sunken place with raised lines.

This form of a stamp is the easiest made and the impression looks well on metal work, as it forms a square rectangle with the designs enclosed. In some cases it is best to heat the steel and drive the cold punch into it, afterwards dressing the stamp with a file.—*T. F. G.*

A BULLETIN describing the courses of instruction for teachers of industrial subjects offered by the Carnegie Institute of Technology has been issued recently. A copy may be had by addressing Dean Clifton Connolly, Pittsburgh, Pa.